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Introduction

This volume is the twenty-fourth in a continuing series of compilations presenting abstracts and indexes of current antarctic literature published since 1962. A companion volume to the series, *Antarctic Bibliography; 1951-1961,* extends the coverage retrospectively.

The material has been compiled jointly by the Cold Regions Bibiography Project at the Library of Congress and by the Scott Polar Research Institute of the University of Cambridge, over a period of 12 months; the cut-off date for inclusion in this volume was December 1996. To provide current awareness, the abstracts have also been distributed as 12 monthly bulletins under the title *Current Antarctic Literature.* The bulletins are generated from a computerized database which is also used in producing this cumulated listing and the indexes.

The present volume contains abstracts numbered from 54,042 to 56,344; these first appeared in issues no.281 through 292 of *Current Antarctic Literature.* The first five volumes each contained 2,000 abstracts. Thus, items 1-2,000 appeared in v.1 (published in 1965), items 2,001-4,000 in v.2 (1966), items 4,001-6,000 in v.3 (1968), items 6,001-8,000 in v.4 (1970), and items 8,001-10,000 in v.5 (1971). V.6 (1973) contained items 10,001-12,244, v.7 (1974) items 12,245-14,447, v.8 (1976) items 14,448-16,899, v.9 (1977) items 16,900-19,248, v.10 (1979) items 19,249-21,721, v.11 (1980) items 21,722-24,083, v.12 (1982) items 24,084-26,452, v.13 (1983) items 24,453-28,961, v.14 (1985) items 28,962-31,756, v.15 (1986) items 31,757-34,660, v.16 (1988) items 34,661-37,522, v.17 (1989) items 37,523-40,798, v.18 (1990) items 40,799-42,875, v.19 (1991) items 42,876-45,062, v.20 (1993) items 45,063-47,376, v.21 (1994) items 47,377-49,497, v.22 (1995) items 49,498-51,653 and v.23 (1996) items 51,654-54041.

The material is arranged in sections representing thirteen subject categories (see table of contents). Items that apply to two or more categories are listed in one section only and cross referenced at the end of the other pertinent sections. Because of this scheme of arrangement, some items dealing with the same subject (from different aspects) will be found in two different categories; e.g. some papers on marine sediments may be found in Section E (Geological Sciences), and others in J (Oceanography). Within each section, abstracts are arranged by accession number; the indexes are keyed to these numbers.

Foreign-language titles are given in English translation first, with the original title following in brackets. Transliteration of Cyrillic and romanization of oriental languages follow the Library of Congress systems. Some of the citations are followed by library call numbers, preceded by the library symbols commonly used in union catalogs.

As a rule, the abstracts are informative rather than descriptive, but no attempt is made to verify or critically evaluate the author's statements or conclusions. Author abstracts are either used verbatim or modified for the sake of brevity or conformity to guidelines adopted for this bibliography.

Four indexes are provided: (1) an author index that includes coauthors (anonymous journal articles are referred to by the article title); (2) a subject index that occasionally extends to two levels of subheadings and contains cross-references; (3) a geographic index to names of places, stations, and geographic features as approved by the U.S. Board on Geographic Names; and (4) a grantee index to names of organizations or institutions that received financial support from the National Science Foundation for work that resulted in publications abstracted in the volume. In each index, entries are cited by a letter, indicating the subject category, followed by the accession number: for example, B-42469 refers to section B, Biological Sciences, item number 42469.

Although the majority of the publications abstracted are in the collections of the Library of Congress, many significant items were lent by or exchanged with other institutions, made available by the Office of Polar Programs of the National Science Foundation, or received as review copies or reprints directly from publishers and authors. Because they contribute to more current and complete coverage, review copies and reprints are especially valuable, and publishers and authors are encouraged to send them to the Library of Congress, Science and Technology Division, Cold Regions Bibliography Project, Washington, D.C. 20540-4750, U.S.A.

Requests for photoreproductions of documents cited in this bibliography, except material protected by copyright, should be directed to the Library of Congress, Photoduplication Service Dept. C-177, 10 First Street SE, Washington, D.C. 20540. U.S. government or government-sponsored technical reports may, in most cases, be obtained from the National Technical Information Service, Springfield, VA 22151. For such reports, NTIS order numbers are usually included in the bibliographic citation.

Stuart G. Hibben, *Head*
Cold Regions Bibliography Project
Science and Technology Division
Library of Congress

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https://archive.org/details/antarcticbibliog24doum

A. GENERAL

A-54069
U.S. antarctic activities, 1993-1994, *Antarctic journal of the United States,* 1994, 29(5), p.xi-xix.

The U.S. Antarctic Program (USAP), which is funded and managed by the National Science Foundation (NSF), supported more than 120 science, engineering, and environmental projects in Antarctica during the 1993-94 antarctic field season. Highlights of some of the USAP projects deal with the dynamics of the west antarctic ice sheet; the fossil recovery of a primitive Southern Hemisphere bird on the Antarctic Peninsula; the Taylor Dome bedrock; the cold desert ecosystem in the McMurdo Dry Valleys; ocean studies in the Amundsen and Bellingshausen Seas; polar ionosphere and magnetosphere; astrophysics at the South Pole; tourism; and the use of alternative energy at McMurdo and Amundsen-Scott Station.

A-54132
Van Wey, N.J., **Antarctica—the ultimate summer institute,** *Physics teacher,* May 1995, 33(5), p.280-281.

The author, a teacher participant in the National Science Foundation program, "Teachers Experiencing Antarctica," narrates his research activities on Taylor Dome, Antarctica, during a workshop held in Nov.-Dec. 1994.

A-54134
Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993, Repelewska-Pękalowa, J., ed, Pękala, K., ed, **XX Polar Symposium. Man impact on polar environment,** Lublin, Poland, Marie Curie-Skłodowska University, 1993, 496p., Most with Polish summaries. Refs. passim. For selected papers see 50-2181 through 50-2218 or B-54135 through B-54143, E-54144, E-54146 and I-54145.

This is a collection of papers presented at the 20th Polar Symposium held in Lublin, Poland, June 3-5, 1993. Twelve of the papers are pertinent to Antarctica and deal with environmental and legal issues, as well as biological, meteorological and geological investigations on the continent and the antarctic ocean.

A-54172
Testa, C., Desideri, D., Meli, M.A., Roselli, C., **New radiochemical procedures for environmental actinide measurements and data quality control,** *Journal of radioanalytical and nuclear chemistry,* July 1995, 194(1), p.141-149, 12 refs.

Plutonium and ^{90}Sr were measured in Mediterranean Sea samples and in environmental samples collected in Antarctica. Some interesting sea-sediment profiles were also obtained. All the chemical methods were verified by adding some yield tracers (^{232}U, ^{228}Th, ^{242}Pu); analyzing some certified samples supplied by IAEA and NIST; participating in some international intercomparison runs; using, when possible, both an analytical and a radiometric method; and following the radioactivity decay or growth (^{90}Y and ^{226}Ra). (Auth. mod.)

A-54255
Santiago de Chile. Instituto Antártico Chileno, **Boletín Antártico Chileno, Vol.14, No.2,** Nov. 1995, 44p., In Spanish. Refs. passim. For selected papers see B-54256 and F-54257.

This bulletin deals with the following: lichen chemistry to minimize UV radiation effects; INACH participation in an international winter expedition to Ross, Amundsen and Bellingshausen seas; evolution of the Antarctic Treaty System (ATS); gaining consultative status in the ATS; INACH activities, including tourism, seminars and scientific meetings; and international activities, such as SCAR, APIS and Antarctic Treaty Consultative meetings.

A-54263
New Zealand Antarctic Society, **Antarctic, Vol.13, No.12,** Christchurch, 1995, p.1-40.

Research activities and news items concerning New Zealand, Australia, United States, Japan and Korea cover the following: the multinational Cape Roberts project; 1996 international events, including various conferences, symposia and workshops; new plans for New Zealand's antarctic involvement; Australia's scientists investigating penguin deaths; the United States research targeting the Sun, melting ice and dinosaurs; a review of U.S. antarctic policy; highlights of Japan's future scientific program SEAL and JARE's summer 1995-1996 research activities; and Korea's plans for KARP's 9th expedition to Antarctica to conduct oceanographic, geological and geophysical investigations. Brief news concerning Heard and Campbell islands, and some general news including the broadening of the ozone hole, conclude this issue.

A-54264
ANARE Club, **Aurora, Dec. 1995, Vol.15, No.2,** Melbourne, 1995, 28p.

The articles and news items in this issue deal with the following: excerpts from the 1995 Davis year book; ANARE wintering expeditioners at Davis, 1957-1995; 1995 Australian Antarctic Medal awards; history of the Polar Medal; book reviews; the James Caird Society; leopard seals; social events; letters and news round-up.

A-54265
ANARE Club, **Aurora, Sep. 1995, Vol.15, No.1,** Melbourne, 1995, 36p.

The articles and news items in this issue deal with the following: the 1994 pilot ozone sonde program at Macquarie I.; an account of Australian seal marking studies in the southern ocean; a voyage to Antarctica by an ANARE Club representative; ANARE wintering expeditioners at Macquarie I., 1948-1994; 1995 ANARE winterers at all four stations; book review; letters and news round-up.

A-54266
Tokyo. National Institute of Polar Research, **Japanese antarctic activities for 1995-1996,** Tokyo, National Institute of Polar Research, [1996], 22p., Exchange of information under Article 7(5) of the Antarctic Treaty.

The following data regarding Japanese antarctic activities for 1995-1996 are presented: details of ships, aircraft and other vehicles; the 37th Japanese Antarctic Research Expedition (JARE) itinerary on board the *Shirase;* details of stations; personnel; work program; scientific equipment; transportation facilities and communication equipment; facilities for rendering assistance; description of unoccupied refuges; notice of oceanographic research ships *Hakurei-Maru* and *Umitaka-Maru* in the Antarctic Treaty area; list of members of JARE-37; information on telecommunication equipment and schedules at Showa Station and Dome F for 1996, and on the *Shirase* from Nov. 1995 to Apr. 1996.

A-54270
Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.10, No.11,** 1995, p.59-65, In Italian and English.

The news items concerning Antarctica in this issue include details on the reconstruction of Amundsen-Scott Station; information from a Vostok ice core on the ice age climate conditions as far back as 200,000 years ago; the inauguration of a new Chilean airstrip to be called Teniente Carvajal; a new polar ship acquired by Chile, named *Almirante Viel,* to replace the old *Piloto Pardo,* active since 1959; and the closing of Georg Forster Station, which will operate for two more years as a German summer base.

A-54322
Scientific Committee on Antarctic Research, **SCAR bulletin No.120, January 1996,** *Polar record,* Jan. 1996, 32(180), p.83-

96.

This bulletin contains the summary report to the 23rd meeting of SCAR, Rome, Italy, Sep. 4-9, 1994, covering the activities of the Group of Specialists on Global Change and the Antarctic (GLOCHANT). Included are lists of stations of SCAR nations operating in the Antarctic in winter 1995, and of the membership of SCAR and its subsidiary groups.

A-54330

Orombelli, G., ed, Smiraglia, C., ed, Terranova, R., ed, Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (Proceedings of the Italian Geographical Society Conference, Rome, 21-22 November 1991), **New geography of the polar regions: synthesis and perspectives** [Verso una nuova geografia delle terre polari: sintesi e prospettive], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, 317p., In Italian with English summaries. Refs. passim. For individual papers see A-54331 through A-54335, A-54338, E-54340, E-54341, E-54343, F-54339, J-54342, J-54344, M-54336, M-54337 or 50-2818 through 50-2825.

DLC G17.S69

This volume is a collection of papers presented at the conference held by the Italian Geographical Society in Rome, Italy, Nov. 21-22, 1991. Most papers, contributed by Italian investigators, are of general geographic interest, and are grouped in three sections: The poles, general problems and comparisons; the Arctic; and Antarctica.

A-54331

Desio, A., **Opening address on the arctic and antarctic regions** [Prolusione sulle terre artiche e antartiche], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.13-25, In Italian with English summary. 14 refs.

DLC G17.S69

The author underlines the importance of the interest shown over recent years in the polar areas, above all the Antarctic. The Italian precursors and pioneers of exploration in polar areas such as Bove, Duca degli Abruzzi, and Nobile are recalled; attempts by the author to plan an Italian antarctic expedition; and for direct involvement by Italy in the Antarctic Treaty, are described. An outline is given of the exploits which led man to reach and explore the summits of the Earth, the North and the South Pole, including those of Peary, Amundsen, Scott and Byrd. (Auth.)

A-54332

Cortemiglia, G.C., Terranova, R., **Antarctica and Greenland: impressions and experiences from scientific and alpine expeditions** [Antartide e Groenlandia a confronto: immagini ed esperienze da spedizioni scientifiche ed alpinistiche], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.27-44, In Italian with English summary. 10 refs.

DLC G17.S69

During an Italian expedition to the Antarctic Peninsula, geological surveys were carried out on the stratified volcanic rocks, lavas and igneous breccias, surmounted by great plates of columnar basalts. Also studied was the geomorphology of suspended beaches, actual beaches and the moraines of Ezcurra Inlet, where fossil plants from the Oligocene were found. Also carried out were meteorological observations and mountain-climbing, reaching the top of seven unnamed mountains. Two skin-divers executed several immersions in the antarctic ocean and medical observations were made with analyses and controls on all the members of the expedition. (Auth. mod.)

A-54333

Amiotti, G., **Notions of the Arctic and the Antarctic in the ancient world** [La nozione di Artico e Antartico nel mondo antico], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.45-51, In Italian with English summary. 14 refs.

DLC G17.S69

This paper analyzes the origin and the evolution of the concept of the arctic and antarctic regions in ancient times, by examining various aspects critically: the philological screening of the names arctic and antarctic in the Greek and Roman world, and the scientific reflection on them when closely related to the geographic discoveries of those extreme areas of the world. An important part is also played by the mythologic elaboration on the arctic and antarctic Terrae Incognitae, elaboration which still aroused emotions in the 18th century. (Auth. mod.)

A-54334

Smiraglia, C., **Reason for a new geography for Antarctica** [Perché una nuova geografia dell'Antartide], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.163-172, In Italian with English summary. 6 refs.

DLC G17.S69

Content and methods for the geographic analysis of Antarctica have recently undergone important changes. In the area of physical geography, a global vision of research into this continent is becoming widespread, backed by current developments in data acquisition techniques, whose key role in understanding variations in the environmental balances of the entire planet is emphasized. From the human geography point of view, geopolitics, population and exploitation of Antarctica appear extremely important. Emphasis is placed on the contrast between those uses which have a decisive effect on the environment (such as tourism and exploitation of mining resources) and those which tend to safeguard it, such as scientific research and the creation of a continental reserve. (Auth.)

A-54335

Cervellati, R., **National Antarctic Research Program** [Il Programma Nazionale di Ricerche in Antartide], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.173-184 + tables, In Italian with English summary.

DLC G17.S69

After some preliminary information on the Antarctic Treaty and on SCAR, a presentation is given of the Italian program, set up under the law of June 10, 1985. The main achievements of this program are described, particularly the seven expeditions performed between 1985-86 and 1991-92, the permanent base at Terra Nova Bay in North Victoria Land, and the first scientific results worthy of note in various areas of research. (Auth.)

A-54338

Baroni, C., **Historic sites and monuments of Victoria Land, heritage of human presence in Antarctica** [Siti e monumenti di interesse storico nella Terra Vittoria, documenti della presenza umana in Antartide], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.219-246, In Italian with English summary. Refs. p.244-245.

DLC G17.S69

Several huts and monuments of historic interest are still preserved in Antarctica. They represent the heritage of the expeditions of the Heroic Age and are protected by the Antarctic Treaty which recognizes 53 sites of historic interest. Victoria Land, discovered by Sir James Clark Ross in 1841, contains several historic huts, mainly related to British antarctic expeditions which took quarters on Ross I. Conservation and restoration of the historic sites was begun in the '60s by New Zealand. Archaeological excavations of the huts and of neighboring areas contribute to the understanding of activities that took place there and can corroborate or correct contemporary written reports. The ice-free areas near the historic sites supply environmental information that is very useful for evaluating the human impact of modem antarctic stations. (Auth. mod.)

A-54350

Byrd, R.E., **Alone: the classic polar adventure,** New York, Kodansha America Inc., 1995, 309p., Originally published: New York, G.P. Putnam's Sons, 1938. Facsimile edition based on the 1938 publication, with a new afterword by D.G. Campbell.

DLC G585.B8A3 1995

It was during this Expedition that Byrd established Bolling Advance Weather Base on the Ross Ice Shelf on the line between Little America and the South Pole. Byrd wanted to be the one to man the Advance Base simply for the experience. Aside from making meteorological and auroral observations, which he did faithfully and meticulously, there was no important work to be done there. As the tale evolved, his most immediate task was to keep himself alive for three months as he battled alone the ravages of carbon monoxide poisoning, winter darkness, bitter cold, and raging winds, to endure what has been termed the greatest adventure of all.

A-54354

Zalewski, S.M., **First Poles in Antarctica—the beginnings of the history of our Antarctic studies** [Pierwsi Polacy w Antarktyce—początki historii naszych badań Antarktycznych], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.41-45, In Polish.

DLC G578.S955 1989

An overview of Polish antarctic studies is presented, from Poland's participation in the second International Polar Year in 1932-1933 through the establishment of Arctowski Station in 1977. Names of the more prominent individuals, the scope of their activities, and dates are cited.

A-54359

Birkenmajer, K., **Prospects for Polish studies in Antarctica** [Perspektywy polskich badań w Antarktyce], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.61-69, In Polish.

DLC G578.S955 1989

A review of the history of Polish activities in Antarctica is presented. The directives for Polish antarctic research for 1991-1995 (geodynamics of the lithosphere and polar marine biology) and the relationship of Polish antarctic research to the international program "Global Change" are discussed.

A-54404

Speak, P., **William Speirs Bruce and the Scottish National Antarctic Expedition,** *Scottish geographical magazine,* Dec. 1992, 108(3), p.138-148, 52 refs.

DLC G1.S43

The saga of William Bruce begins with an account of the origins of the Scottish National Antarctic Expedition and its sponsorship by Scottish intellectual societies. At the outset it sought support from the Royal Geographic Society through Sir Clements Markham. Markham dallied, Bruce waited and eventually sailed off in the *Scotia* blessed fully by Scottish support. An account of much of Bruce's interests, education, experience, and preparation is provided in outline. *Scotia* sailed on Nov. 2, 1902 on Atlantic tracks often seen in the 1990s on voyages by *Polarstern* and others, with the exception that while these latter-day expeditions call at Ushuaia, *Scotia* visited the Falkland Islands before sailing the Weddell Sea, back-tracking to Buenos Aires and Montevideo, thence back to the Weddell Sea to discover and name Coats Land before returning to Scotland via Gough I., Cape Town, Cape Verde and the Azores. The Expedition achieved all its scientific objectives and brought home vast amounts of data, rocks, and biological specimens.

A-54429

Pilling, G., Parkes, G., **Performance and geometry of the FP-120 trawl used during UK fish stock assessment surveys around South Georgia, Subarea 48.3,** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.51-69, With French, Russian and Spanish summaries. 20 refs.

Methods for calculating the horizontal opening of a bottom trawl are discussed. *In situ* measurements of the FP-120 trawl used during the 1993-94 UK fish stock assessment survey around South Georgia on the MV *Cordella* are presented. Regression equations for the estimation of horizontal opening from other more easily measured variables, such as tow speed and trawl depth, are proposed. Biomass estimates for the major fish species around South Georgia are estimated using a new regression equation. The results of this calculation are compared to values obtained from a previous equation. The resulting difference in biomass estimates is of the order of a 10 to 14% increase, depending upon species. (Auth.)

A-54435

Seureau, J., **Dumont d'Urville in Antarctica: log of Joseph Seureau, Quartermaster of His Majesty's French Corvette *Zelée* (1837-1840)** [Dumont d'Urville en Antarctique: journal de bord de Joseph Seureau, quartier-maître de la *Zélée* (1837-1840)], Paris, France, Publisud, 1995, 141p., In French. Edited by C. Méhaud and H. Richard. Address inquiries to H. Richard, c/o Publisud, 15 Rue des Cinq-Diamants 75013 Paris, France. Refs. included as footnotes.

DLC G420.D84S48 1995

Introductory pages provide information about the persons involved in the production of the book, including a remembrance of principal editor Catherine Méthoud, who died before publication. Also given is a brief biography of Seureau prior to and following the voyage with d'Urville. There is a resumé of the voyage route from Toulon and return. Numerous dated entries comprise the main body of the log and give details of the many anchorages used; lengthy passages describe the ice and snow in the higher latitudes and some of the medical problems encountered. The voyage lasted from 7 Sep 1837 to 5 Dec 1840 for a total of 3 years, 4 months, and 28 days.

A-54452

Copson, G., **Macquarie Island biosphere reserve,** *Northern Sciences Network Newsletter,* Dec. 1995, No.18, p.18-20.

A brief sketch of Macquarie Island is presented. The station dates from 1948 when ANARE opened a research station which has operated continuously since that time. A broad spectrum of programs totalled 68 from 1990 to 1995 and includes data collection, research, and management items. The entire island is designated a fully protected biosphere.

A-54490

Kiernan, V., **Breakdown freezes ice core project,** *New scientist,* Jan. 13, 1996, 149(2012), p.10.

Russia's Vostok research station in Antarctica will be shut down for the winter and its workers evacuated after a convoy carrying fuel and supplies broke down and had to turn back. The closure will stop work on an international drilling project at Vostok jointly sponsored by Russia, the U.S. and France. The project has produced the oldest existing ice core, extending back more than 300,000 years. The core, from the East Antarctic ice sheet, is expected to chart the changes in the climate over this time. (Auth. mod.)

A-54494

Shimizu, H., **Place names in Alexander Island, West Antarctica,** *Polar news,* Mar. 1996, No.62, p.33-39, In Japanese. 3 refs.

A brief history is presented of British exploration on Alexander I. conducted by Operation Tabarin 1943-1947, reorganized as the Falkland Islands Dependencies Survey (FIDS) 1947-1962, and since 1962 reorganized again as the British Antarctic Survey (BAS). A table is provided listing 71 official place names, each with its Japanese transliteration, coordinates, and year that it was named by FIDS or BAS. All of the places are named after classical musical composers or compositions. An additional nine glaciers: Jupiter, Pluto, Eros, Uranus, Mercury, Venus, Neptune, Mars, and Saturn, named after Roman and Greek mythological figures by the U.S. Board on Geographic Names, are also listed. Two sketch maps are provided showing the locations of all the place names.

A-54503

Argentina. Dirección Nacional del Antártico, **Communication Days on Antarctic Investigations** [Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas], Buenos Aires, Instituto Antártico Argentino, 1993, 343p., In Spanish. Refs. passim. For selected papers see B-45404 through B-54511, B-54515, E-54513, E-54516, E-54519 through E-54536, E-54538 through E-54545, F-54512, F-54517, G-54537, I-54518 and J-54514.

DLC G845.5.J67

This is a collection of approximately 100 brief reports, presented for discussion during the Communication Days on Antarctic Investigations held in Buenos Aires in Nov. 1991. The research reported covers many disciplines, including geopolitical sciences, and was carried out mostly in the 1980s.

A-54639

First Ukrainian national Antarctic science programme takes over British Research Station, *NERC news,* Jan. 1996, No.34, p.7.

In Feb. 1996, the first national team of Ukrainian antarctic researchers took over responsibility for the British Antarctic Survey's Faraday Station, which was formally transferred to Ukraine in July 1995.

A-54694

Rosenberg, J.E., Hewitt, R.P., Holt, R.S., **U.S. Antarctic Marine Living Resources (AMLR) program: 1993-1994 field season activities,** *Antarctic journal of the United States,* 1994, 29(5), p.181-183.

The U.S. Antarctic Marine Living Resources (AMLR) program has developed and conducted a research plan tailored to the goals of the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR). The AMLR program monitors finfish and krill fisheries, projects sustainable yields where possible, and formulates management advice and options. In addition, the program conducts field research with the long-term objective of describing the functional relationships between krill, their predators, and their environment. The 1993-1994 field program included a 2-month research cruise aboard the ship *Surveyor* near Elephant I. Also, land-based studies were conducted at a seasonal field camp on Seal I. and at Palmer Station.

A-54695

Hewitt, R.P., Demer, D.A., **AMLR program: Distribution and abundance of krill near Elephant Island in the 1993-1994 austral summer,** *Antarctic journal of the United States,* 1994, 29(5), p.183-184, 2 refs.

Two specific objectives for the acoustic surveys reported here were the following: to map mesoscale (10s to 100s of km) features of the distribution, density, and abundance of krill in the area around Elephant I.; and to map microscale (1 to 10s of km) features of the distribution, density, and abundance of krill immediately north of Elephant I., within the foraging range of krill predators breeding at Seal I. To address these objectives, two large-area surveys and two small-area surveys were conducted near Elephant I. between mid-Jan. and mid-Mar. 1994. The average density for the large-area survey was the lowest observed during the last 5 years of AMLR surveys in the Elephant I. study area and was approximately one-seventh of the 1990-1993 average density.

A-54712

Wharton, R.A., Jr., **McMurdo Dry Valleys LTER: An overview of 1993-1994 research activities,** *Antarctic journal of the United States,* 1994, 29(5), p.224-226, 12 refs.

The McMurdo Dry Valleys are now a site within the National Science Foundation's LTER network. During the 1993-1994 field season, 18 scientists deployed to McMurdo Station and Taylor Valley to conduct research associated with the LTER project. Scientists initiated core measurement programs to obtain baseline ecologically relevant data from glaciers, streams, soils, and lakes. This paper and the 10 following papers highlight some of the accomplishments of the 1993-1994 season, as well as projects related to LTER data and information management.

A-54733

U.S. National Science Foundation. Division of Polar Programs, **United States Antarctic Research Program. Science program plan 1988-1989,** [Washington, D.C.], [1988], 149p., Unpublished manuscript.

This plan contains a synopsis of each science project planned for the 1988-89 United States Antarctic Program. In summary, the USAP will support 76 projects involving 282 investigators and technicians. Of those 62 projects 232 persons will transit through New Zealand and McMurdo Station (referred to as the Continental System). Continental System projects can be further broken down as 35 projects based out of McMurdo Station (including sea ice and Dry Valley work), 16 projects at Amundsen-Scott Station, and 11 requiring dedicated LC-130 support to remote field camps. There are 15 projects with 50 persons that involve Palmer/*Polar Duke* support (Peninsula System). This plan is generally descriptive and is meant as a summary of projects that have received support for research in Antarctica.

A-54734

Australia. Cooperative Research Centre for the Antarctic and Southern Ocean Environment. (Antarctic CRC), **Annual report, 1994/95,** Hobart, Tasmania, [1995], 60p.

This report describes the Antarctic CRC's research objectives, its structure and management, the aims and progress in southern ocean processes research and the research sub-programs, commercialization, scholarships provided to students of the Institute of Antarctic and Southern Ocean Studies and to other higher degree students, and cooperative linkages. The report also provides information on the Antarctic CRC's staffing and administration, publications, public presentations, public relations and communication, its grants and awards, performance indicators, its budget, research staff resources, and the audit report for the year ended June 30th, 1995.

A-54735

U.S. National Science Foundation. Office of Polar Programs, **U.S. Antarctic Program, 1995-1996 research,** Washington, D.C., Nov. 1995, 35p.

During the 1995-1996 austral summer field season, approximately 650 scientists and other specialists will conduct 136 research projects in Antarctica. Supported by the National Science Foundation (NSF), 71% of these individuals will travel through New Zealand to McMurdo Station on Ross I. About two-thirds of these projects will go to remote field camps in the McMurdo Dry Valleys, in the Transantarctic Mountains, or West Antarctica; will be based at Amundsen-Scott Station; or will work aboard the icebreaking research ship *Nathaniel B. Palmer.* Studies at the remote field camps include investigations of the continent's geologic and glacial history, the dynamic behavior of the West Antarctic Ice Sheet, and the characteristics and ecology of the sparse terrestrial life inhabiting the dry valley region. About 4% of this season's projects will be conducted in conjunction with other national antarctic programs or be supported aboard commercial tour ships. The projects are briefly described.

A-54743

Republica Oriental del Uruguay, **National report to SCAR on antarctic research activities, No.6. April 1994-March 1995. Planned activities 1995-1996,** Montevideo, Instituto Antártico Uruguayo, 1995, 46p., Refs. p.42-43.

This report provides the following: map and coordinates of Artigas Station; an outline of research carried out on the mobile meteorological station R.O.U. *Vanguardia;* a report on activities from Apr. 1, 1994 to Mar. 31, 1995, covering investigations in atmospheric and Earth sciences, oceanography, biology, medicine and logistics; planned activities for Apr. 1, 1995 to Mar. 31, 1996, involving the same disciplines (minus logistics) as in the previous year; a list of principal researchers and responsible authorities, and a list of the members of the Directive Council of the Uruguayan Antarctic Institute.

A-54744

Brazil. Comissão Interministerial para os Recursos do Mar, **Twenty years of Brazilian adherence to the Antarctic Treaty** [20 anos da adesão brasileira ao Tratado da Antártica], *Informativo CIRM,* Jan./June 1995, 7(1), p.2-3, In Portuguese.

Following a brief review of the signing of the Antarctic Treaty in 1959 and its implementation in 1961, the article describes the events which led Brazil to join the Treaty in 1975. A brief chronology of Brazilian activities in Antarctica during the last 20 years through the Brazilian antarctic program PROANTAR, its organizational structure and logistic and operational support by the Brazilian Navy, are presented.

A-54746

U.S. National Science Foundation. Division of Polar Programs, **Facts about the U.S. Antarctic Program,** Washington, D.C., U.S. National Science Foundation, 1990, 19p.

This pamphlet provides a digest of the United States Antarctic Program operation: a description of year-round U.S. stations and summer camps, transportation facilities, research objectives, Federal responsibilities, the international cooperation and U.S. policy for Antarctica, and past U.S. antarctic expeditions. Instructions for further information regarding maps, photographs, bibliographies and reference materials are included. A complete text of the Antarctic Treaty is presented in an appendix.

A-54750

Italian National Scientific Commission for Antarctic Research, **Italian antarctic scientific research activity report, June-1995. Record of activities from Apr. 1, 1994 to Mar. 31, 1995. Planned activities from Apr. 1, 1995 to Mar. 31, 1996,** Rome, 1995, 61p.

After covering the organizational structure of the Italian National Scientific Commission for Antarctic Research, the report lists the facilities and equipment at Terra Nova Bay Station, including its permanent observatories, and provides highlights of science activities in progress during Apr. 1994-Mar. 1995, and proposed for Apr. 1995-Mar. 1996. Disciplines include biology, cartography, geology, terrestrial and atmospheric physics, glaciology, meteorology, human biology and medicine, environmental impact assessments, and oceanography.

A-54757

Laws, R., **[Remembrance: William Nigel Bonner],** *Marine mammal science,* Oct. 1995, 11(4), p.596-598.

This brief essay provides a summary of the professional life of Nigel Bonner who died Aug. 27, 1994. Bonner was intimately acquainted with the antarctic and subantarctic regions and especially with the whales and seals which plied the seas there. Beginning in 1953, he spent ten seasons and three winters at South Georgia studying these large mammals. Later he lectured on marine mammals at Sir John Cass College in London, then joined the Natural Environment Research Council (NERC) as head of the Seals Research Unit. In 1974 he assumed leadership of SCAR efforts on conservation, remaining in that post for 17 years. Also in 1974 he was appointed Head of the Life Sciences Division of BAS and served as its Deputy Director from 1986-1988. During his lifetime he published some 100 papers and several review-type books on whales and seals, the last in 1994.

A-54765

Lopetegui Torres, J., **Antarctica: a peremptory challenge** [Antártica: un desafío perentorio], Santiago de Chile, Ediciones Génesis, June 1986, 135p., In Spanish. Refs. p.131-134.

DLC G860.L66

The book consists of 6 chapters providing the following: a general description of the antarctic continent; a historical review of man's involvement in Antarctica, his exploration and expeditions; an outline of the Antarctic Treaty; a review of antarctic resources, tourism and transportation facilities; and historical antecedents and the geopolitical significance of Chilean activities in Antarctica, with an analysis of Chile's alternatives or options regarding its position toward Antarctica.

A-54770

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.10, No.12,** 1995, p.66-73, In Italian and English.

The news items concerning Antarctica in this issue include details on the USAP efforts to improve understanding of biological phenomena and processes in polar regions; the probable existence of an ice-covered lake, located 3700 m beneath the ice at Vostok Station; an international project at Arctowski Station, between tourists and station personnel, to improve the environment; new regulations regarding environmental protection of Bouvet I., and the BAS field station on Bird I.

A-54771

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.1,** 1996, p.1-7, In Italian and English.

The news items concerning Antarctica in this issue include details on the AMANDA neutrino detector operating at Amundsen-Scott Station; Australian research programs and facilities on Macquarie I.; the krill diet of Adélie penguins from Hope Bay; and the survival at low temperatures of 3 species of tardigrades from Queen Maud Land.

A-54772

Italy. Consiglio Nazionale delle Ricerche, **Ambiente Antartide, Dec. 1995, No.6,** Rome, 1995, 72p., In Italian. For selected papers see A-54777, A-54781, B-54773, B-54779, B-54780, C-54782, C-54783, I-54774, I-54775, K-54776 and M-54778.

This issue begins with an editorial presenting the activity balance of the Italian antarctic 5-year-program of 1992/1996, and outlining the new 5-year-program of 1995/1999 and CNR participation in it. This issue contains 9 full length papers covering past, and outlining future, studies in Antarctica in various disciplines, as well as reports on Swedish antarctic policy and on tourism regulations discussed at the Kyoto Consultative Parties' meeting. In addition, various international meetings are reviewed and miscellaneous news, some dealing with new technologies for air navigation and data automation, are presented.

A-54777

Comisso, R., **Swedish antarctic scientific policy** [La politica scientifica antartica della Svezia], *Ambiente Antartide,* Dec. 1995, No.6, p.30-37, In Italian with English summary. Refs. p.36-37.

The Royal Swedish Academy of Sciences established a Committee for Polar Research in 1981, and in 1984 the government and parliament created the Secretariat for Polar Research. About 150 Swedish scientists have been involved in the polar regions since the creation of the Secretariat. In this period Sweden organized two major expeditions to Antarctica (SWEDARP, of about 90 and 50 scientists, respectively), costing about 12M SEK each. Sweden has been continuously active in the Antarctic in international cooperative programs; a recent agreement with Finland and Norway provides for logistic cooperation in the antarctic region. The prevailing, although not exclusive, scientific interests of Sweden are in the fields of glaciology, Earth sciences, marine physics and chemistry. (Auth. mod.)

A-54781

Casacchia, R., Picchiotti, A., Salvatori, R., **RADARSAT: new research opportunities in polar regions** [RADARSAT: nuove opportunità di ricerca per le aree polari], *Ambiente Antartide,* Dec. 1995, No.6, p.53-56, In Italian with English summary.

The Canadian Space Agency (CSA) will launch the Radarsat satellite in Aug. 1995. Radarsat will operate a synthetic aperture radar (SAR) sensor that will collect data over the antarctic continent in two passages, in Oct. 1996 and Oct. 1998. The CSA, along with NASA, is offering the opportunity to the international scientific community to make use of Radarsat data for scientific applications by submitting proposals to the ADRO (Application Development and Research Opportunity) program. In this note, information is provided about the main features of the ADRO program, its scientific goals, and modes of data acquisition over Antarctica. A brief description of the scientific applications that may be performed by means of SAR data is also provided.

A-54792

Australia. Institute of Antarctic and Southern Ocean Studies (IASOS). Cooperative Research Centre for the Antarctic and Southern Ocean Environment (Antarctic CRC), **Postgraduate research and training,** Hobart, Tasmania, [1995], n.p.

This booklet, issued by IASOS in association with the Antarctic CRC, provides postgraduate candidates with information on the academic program in different disciplines available to them to pursue their degrees. It includes a description of Antarctic CRC and its research programs, as well as details on admissions, applications, and financial assistance and scholarships available.

A-54793

New Zealand Antarctic Programme (NZAP), **Bibliography of international Dry Valley publications, Vol.3, 1985-1994,** Christchurch, 1995, 50p.

The *Bibliography of international Dry Valley publications* cites references to research carried out in the Dry Valleys region, Ross Dependency. It is arranged in sections according to primary scientific subject content. Within each section, items are arranged alphabetically by author surname. An author index is supplied at the back.

A-54799

Martin, V.G., ed, Tyler, N., ed, World Wilderness Congress, 5th, Tromsø, Norway, Sep. 1993, **Arctic wilderness: the 5th World Wilderness Congress,** Golden, CO, North American Press, 1995, 342p., For selected papers see A-54800, A-54801, B-54805 and M-54802 through M-54804.

DLC QH77.A68W67 1993

This volume contains material presented at the 5th World Wilderness Congress (WWC) convened in Tromsø, Norway, in Sep. 1993. The WWC is a permanent, international public forum where diverse groups of professionals meet with members of the public to address and act on critical matters concerning the environment. Six of the presentations are pertinent to Antarctica. Resolutions of the 5th WWC reported here deal with international conventions and agreements, protected areas, definition and assessment of wilderness, sustainable use of resources, and pollution issues, among others.

A-54800

Dingwall, P., **Is tourism a threat to polar wilderness? An antarctic case study,** World Wilderness Congress, 5th, Tromsø, Norway, Sep. 1993: Arctic wilderness, edited by V.G. Martin and N. Tyler, Golden, CO, North American Press, 1995, p.87-96.

DLC QH77.A68W67 1993

The current status of the thriving tourism industry in Antarctica is described. Tourism has become the second most important commercial activity in the region after fishing. This rapid expansion in the number of tourists and the variety of their activities has caused many profound impacts on the antarctic environment. Although the Antarctic Treaty made certain provisions for tourism, the rules governing tourist activities in the region have evolved in an *ad hoc* manner and remain incomplete. A brief history of tourism development in the Antarctic is followed by an analysis of the impacts of tourism on the region. Issues that must be addressed by additional regulations are discussed, including liability for environmental damages and procedures for inspecting tourist vessels. (Auth. mod.)

A-54801

Roots, F., **Polar wilderness: what does it contribute and to whom?,** World Wilderness Congress, 5th, Tromsø, Norway, Sep. 1993: Arctic wilderness, edited by V.G. Martin and N. Tyler, Golden, CO, North American Press, 1995, p.118-127.

DLC QH77.A68W67 1993

The polar regions of the planet represent some of the last untouched wilderness on Earth. Human societies have typically held polar wilderness in spiritual and psychological awe. Polar regions are considered extremely beautiful, and illustrate the power of the elements for most onlookers. Polar wilderness regions are considered a necessary counterbalance to modern industrialized society. An overview of the European fascination with polar wilderness is presented, along with an analysis of indigenous peoples' views of polar wilderness. Modern commercial, political, and scientific conceptions of the arctic and antarctic polar wilderness are discussed. (Auth.)

A-54819

Kiernan, V., **US frost chills polar stations,** *New scientist,* Mar. 2, 1996, 149(2019), p.14-15.

This report analyzes the possible effects of congressionally imposed budgetary reductions on the operation of United States antarctic stations.

A-54824

Pearce, F., **After the Falklands bonanza,** *New scientist,* Feb. 17, 1996, 149(2017), p.32-35.

The author/consultant outlines pertinent aspects of the Falklands' economy which is undergoing changes in cash flow resulting from 1) the fishing grounds around the Islands experiencing a decline; 2) the wool industry being shaky; and 3) the high cost of imported goods and alternative methods and technologies. A small aircraft operation for moving people, absent an outback road system, loses £4,000/yr, which works out to £60 for every passenger trip. Such basic technologies as telephones to serve the Islanders in remote areas will cost >£7,000/phone. Falklands government land reforms have not been well received; wool production has remained substantially as high as ever but wool prices have declined by more than half over a 60 year span.

A-54825

Galimberti, D., Ucha, S.B., **Report on the transit of antarctic tourism through Ushuaia, 1994-1995** [Ushuaia 'Puerta de entrada a ala Antártida'. Informe sobre el tránsito de turismo antártico a través de Ushuaia, 1994-95], Ushuaia, Argentina, Instituto Fueguino de Turismo. Oficina Antártica, 1995, 17p., In Spanish.

DLC G155.A54G35 1995

A program to monitor antarctic touristic activities begun by the Instituto Fueguino de Turismo in the 1992-1993 season is described. A comparative analysis with previous seasons is made of the information on tourist operations carried out through the Ushuaia harbor in the season of 1994-1995. The data presented include the name and flags of ships, the date of transit through Ushuaia, the number of passengers on board, the name of the operating tourist agency, and travel characteristics, such as the ships' passenger capacity, percentage of occupancy, number and duration of trips, etc. A comparative analysis of the above results with global marine tourism to Antarctica in the last 4 years is also discussed.

A-54826

Pereyra Prieto, O., Gliksberg, I., **Uruguay in antarctica: a new horizon, a challenge** [Uruguay y Uruguayos en la Antártida: un nuevo horizonte, un desafío], Montevideo, Arca, 1994, 176p., In Spanish.

DLC G860.P44 1994

An account is given from the senior author's diary of his training and impressions experienced at the Uruguayan antarctic station Artigas during the 1986-1987 summer season and the second wintering-over of 1987. The book also contains a contribution by the second author relevant to Uruguay's geopolitical interests and scientific activities in Antarctica, and succinct information on antarctic ecology and resources.

A-54827

Spain. Ministerio de Agricultura, Pesca y Alimentación. Instituto

Español de Oceanografía, **Journey to Antarctica: first Spanish scientific and fishery expedition** [Un viaje a la Antártida: primera expedición cientifico-pesquera española], Madrid, Spain, 1990, 246p., In Spanish. Refs. p.240-244.

DLC G850 1988.E96V53 1990

The bulk of this book consists of 13 contributions with information relative to Antarctica, some of it obtained during the first Spanish antarctic expedition in 1986-1987. The material presented includes a historical review of European interest in the antarctic continent over the last centuries; details of the Spanish antarctic expedition "Antártida 8611"; and brief accounts of antarctic geology, glaciology, ecology and marine biology, focusing on antarctic fishes and their availability for commercial exploitation. The text is accompanied by numerous photographs.

A-54877

Rajan, H.P., **Selection and management of antarctic personnel—Indian antarctic programme,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.185-189.

The organizational structure behind the Indian antarctic program in general, and the process of selection of scientific personnel and projects in particular, are outlined.

A-54878

Kawakubo, M., Umeki, K., Shiraishi, K., **Selection and management of Japanese antarctic personnel,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.191-200.

The Japanese Antarctic Research Expedition (JARE)'s structure and annual itinerary are outlined, and the process of personnel selection, including medical screening, training and management, is described.

A-54894

125 years of German polar research [125 Jahre deutsche Polarforschung], Bremerhaven, Germany, Alfred Wegener Institut für Polar-und Meeresforschung, 1994, 191p., In German.

DLC G593.A15 1994

This work is an outline of the German presence in polar scientific research from 1868 through 1993. It is organized as a chronological listing of German expeditions to both arctic and antarctic regions. Vignettes describe each expedition in text, drawings, sketches, photographs, and charts; prominent polar figures such as Petermann, Koldeway, Tegettoff, Neumayer, Drygalski, Vahsel, Wegener and others are discussed. The progression from sails to steam to diesel power sources, from artists conceptions to b/w photography to full color, from single-engine open cockpit aircraft to dirigibles to heavy four-engined cargo craft: all are registered in this 125 year time frame. The emphasis shift from pure scientific research to political expediency of the polar presence is duly noted as international tensions mounted during the mid- to late 1930s. Following WWII, microphotography and photomicrography techniques were introduced and refined, the Antarctic Treaty was developed and came into force, the programs of the DDR and FRG were carried out, antarctic stations were established, and research institutions were founded. This work tells a little bit about a lot of things and provides a starting point for investigating the German influence on polar research.

A-54911

Yoshikawa, K., ed, Harada, K., ed, Ishimaru, S., ed, **Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993,** Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, 258p., Refs. passim. For individual papers see C-54914, E-54912, E-54913, E-54915, F-54917 through F-54921, G-54926, H-54924, H-54925, I-54916, I-54922, I-54923 or 50-4382 through 50-4389.

The main purpose of this expedition was to carry out snow and air sampling from the coasts inland toward the South Pole, and to conduct geomorphological investigations of the Ellsworth Mountains. This volume contains 15 reports of investigations carried out, including the results of efficiency and durability tests of a variety of polar equipment. The introduction gives details of the expedition's itinerary and logistics, outlines the field work activities, and describes the equipment used. A meteorological data list concludes the volume.

A-54964

Makarov, R.R., Men'shenina, L.L., Latogurskiĭ, V.I., **Antarctic krill fishery (*Euphausia superba* Dana) and problems of the rational exploitation of its resources** [Promysel Antarkticheskogo krilia (*Euphausia superba* Dana) i problemy ratsional'nogo ispol'zovaniia ego resursov], *Antarktika,* 1993, No.32, p.111-124, In Russian with English summary. 48 refs.

The authors describe the current situation in respect of the main regions of *E. superba* fishery and also the seasonal changes in the fishery related to ice cover dynamics. The total annual catch (for all fishing countries) which is now 300,000 tons does not affect *E. superba* recruitment or disturb the feeding patterns of *E. superba* predators. The lack of precise data for a number of parameters necessitates a very rational approach to fishery practice. In this connection it is reasonable to widen the region of fishery activities, concentrating them mainly in the waters of the Antarctic Circumpolar Current. Ecological and fishery monitoring are required as a possible basis for developing *E. superba* fishery and population modelling to control resources under fishery stress. (Auth.)

A-54966

Australian Antarctic Division. Department of the Environment, Sport and Territories, **Looking south: the Australian Antarctic Program in a changing world,** Hobart, Australia, 1995, 31p.

This booklet describes the Australian Antarctic Program and its four goals: understanding global climate change; protecting the antarctic environment (including management of the antarctic marine ecosystem); obtaining information of practical importance in meteorology, geology and atmospheric physics; and maintaining the Antarctic Treaty System and Australia's influence in the system.

A-54982

Stehberg, R., Lucero, V., **Coexistence between sealers and Fueguinian aborigines on Desolation I., early 19th Century** [Evidencias de coexistencia entre cazadores de lobos y aborígenes fueguinos en isla Desolación, Shetland del Sur, Antártica, a principios del siglo XIX], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.67-88, In Spanish with English summary. 20 refs.

Results obtained in archeological surveys and excavations on Desolation I. in Jan. 1995 are discussed. Four sealer-settlements were found in the Cora isthmus and cove corresponding to a hunting cycle which took place between 1819 and 1830. In two of the settlements, certain materials of that era were found which clearly show an aboriginal provenance. It is concluded that these materials were brought from Tierra del Fuego and the Magellan Strait by aboriginal workers hired to help in the hunting and skinning of seals. (Auth. mod.)

A-54994

Del Valle, R., Tatur, A., **Holocene evolution of landscape and biota on King George Island, Antarctica,** *International Association of Theoretical and Applied Limnology. Verhandlungen. Proceedings. Traveaux,* Dec. 1993, 25 (Part 2), p.1128-1130, Congress in Barcelona 1992. Edited for the Association by A. Sláděckova. 19 refs.

DLC QH98.I5 v. 25, pt. 2 1992

A literature review from the 1970s to the early 1990s is presented to outline the changes in landscape experienced on King George Island during the Holocene deglaciation period. Glaciers of various lineages, abandoned lakes, isostatic uplift, volcanic eruptions, vegetation development following the eruptions, the influence of penguins and other birds on vegetation, and the unclear beginnings of penguin colonization on the island are all treated in the writings during the twenty-plus years covered in this brief essay.

A-55005

Scientific Committee on Antarctic Research, **SCAR bulletin**

No.121, April 1996, *Polar record,* Apr. 1996, 32(181), p.184-195.

This bulletin contains a report on decisions, measures and resolutions adopted at the 19th Antarctic Treaty Consultative Meeting held in Seoul, Korea, on May 8-19, 1995. Attached are four Antarctic Inspection Checklists designed to provide guidelines to observers conducting inspections in Antarctica in accordance with the provisions of Article VII of the Antarctic Treaty.

A-55009

Istituto Geografico Polare Silvio Zavatti, **Il Polo, Dec. 1995, Vol.4,** Fermo, Italy, 1995, p.13-14, In Italian.

The only article pertinent to Antarctica in this issue deals with the participation of the Italian Military Marine in the national antarctic program. A list of names and rank of the military participating in 10 Italian antarctic expeditions between 1985 and 1995, along with some background information, is provided.

A-55012

Australia. Antarctic Division, **ANARE news, No.76,** Kingston, Tasmania, 1996, 63p.

The beginning feature presented in this issue deals with the 1995-1996 Australian antarctic summer program, starting on July 17, 1995 with the departure from Hobart of the *Aurora Australis.* The projected studies include glaciology, marine biology, environmental impact assessment and geology. The science news items consist of brief reports on the inaugural Albatross Conference held in Hobart Aug. 28-Sep. 1, 1995; infectious diseases and parasites of penguins; salt deposits in the Vestfold and Larsemann Hills; and wave observation at Davis Station. Other information concerns activities at Australian stations and news of a general nature, review of recent publications, weather summaries for Apr.-Sep. 1995 at Mawson, Davis, Casey and Macquarie I., and a 1996-1997 chronology of meetings.

A-55015

U.S. National Science Foundation, **Antarctic journal of the United States, Vol.29, No.4,** Washington, D.C., Dec. 1994, 19p., Refs. passim.

Articles in this issue deal with the following: an archaeological survey of Marble Point, Jan. 22-23, 1994; satellite data confirming that the CFCs cause the continuing depletion of ozone at record levels; photographs of the 1994 austral winter at McMurdo Station; USAP's Applied Environmental Research Program; fossil discoveries confirming that dinosaurs did roam Gondwanaland; science news from Antarctica, including a comet's week-long series of collisions with the planet Jupiter viewed from the South Pole Observatory; and Foundation awards of funds for antarctic projects, June 1 to Aug. 31 1994. Monthly reports on weather conditions at McMurdo, Palmer, and Amundsen-Scott stations, from Nov. 1993 through Oct. 1994, conclude this issue.

A-55016

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.2,** 1996, p.8-14, In Italian and English.

The news items concerning Antarctica in this issue include details on the ecological impact of increased meltwater flows into Lake Vanda; field investigations on permafrost properties and the human factor effects; an international walking expedition from the Filchner Ice Shelf to the South Pole, which will set off in Oct. 1996; and tourist flights of Qantas between Nov. 26, 1995 and Feb. 25, 1996.

A-55017

ANARE Club, **Aurora, Mar. 1996, Vol.15, No.3,** Melbourne, 1996, 28p.

The articles and news items in this issue deal with the following: a museum exhibit in Launceston showing visitors a detailed view of Australia's antarctic work based around Casey Station; the study of ice cores from drill holes on Law Dome; ANARE happenings in 1995-1996; the Kinematic Amery Oversnow Survey; book reviews; social events; letters and news round-up.

A-55020

New Zealand Antarctic Society, **Antarctic, Vol.14, No.1,** Christchurch, 1996, p.1-40.

Research activities and news items covered in this issue deal with the following: a multi-national geological drilling project at Cape Roberts; Polish, Norwegian, Canadian and English expeditions; details on the structure and function of the New Zealand Antarctic Institute; the United States 1995-1996 Operation Deep Freeze and budget cuts; the 1995-1996 Belgian summer program and its structure and history; BAS transfer of Faraday Station to Ukraine; China's contribution of an icebreaker to a joint research program with New Zealand; the Japanese wintering team discovering a seed plant growing near their base, attributed to global warming; the Antarctic Club of India; the return from a year-long antarctic sojourn by an Australian couple; activities at Australian stations, including Macquarie I.; Greenpeace's objection to Japanese interest in Minke whales; and miscellaneous items.

A-55024

Benedick, R.E., **Ozone diplomacy: new directions in safeguarding the planet,** Cambridge, MA, Harvard University Press, 1991, 300p., Refs. p.270-293.

DLC K3593.B46 1991

The negotiations leading to the Montreal Protocol on protection of the ozone layer are described. The policymaking and diplomatic process, from the first scientific hypotheses in the 1970s, through negotiations of the 1985 Vienna Convention and the 1987 Montreal Protocol, to the crucial implementation issues that arose after the protocol's signing, are analyzed. The book attempts to provide a comprehensive account of how the international community approached an unprecedented global ecological threat, such as greenhouse warming, deforestation, air and water pollution, and mass extinction of species. The author points out that many of the key provisions of the protocol, described in detail, represent innovative solutions to complicated equity and technical issues that have relevance for future negotiations. Full texts of the Vienna Convention and the Montreal Protocol, and their revisions, signing and ratifying documents, are appended.

A-55026

Harrowfield, D.L., **Sledging into history,** Auckland, N.Z., Macmillan Company of New Zealand Ltd., 1981, 119p., Refs. p.115-119.

DLC G870.H23 1981

The author presents a descriptive and pictorial record of three historic huts on Ross I. and their contents as they are today. He points out that since 1960 the huts have been carefully restored and maintained by New Zealand's Antarctic Division, with assistance from other Government bodies and the U.S. Navy which has provided logistic support in the field. The author also sets down his personal reminiscences, observations and impressions from a 5-week visit to Antarctica during the summer of 1977-1978. A chronological list of expeditions to the Ross Dependency sector of Antarctica, 1772-1958, is provided.

A-55027

Venables, S., **Island at the edge of the world: a South Georgia odyssey,** London, U.K., Hodder & Stoughton, 1991, 177p., 12 refs.

DLC GV199.44.S63V46 1991

An account is given of the author's memories and impressions experienced during an expedition to South Georgia in the summer of 1989-1990. Itinerary and logistics of the expedition are described in detail. A chronology of expeditions to South Georgia, from Captain Cook's in 1775 to the 1991 *Caradoc Jones* expedition, is presented at the end of the book.

A-55036

Finland. Ministry of Trade and Industry. Industry Department, **Evaluation of the Finnish antarctic activities,** Ministry of Trade and Industry Publications, Helsinki, Apr. 1995, 128p., Refs. passim.

DLC G877.E93 1995

In the spring of 1994, the Finnish Ministry of Trade and Industry decided to launch an evaluation of Finland's antarctic activities. The purpose of this evaluation has been to find out whether the initial aims have been attained and whether important new targets have emerged. A further purpose has been to investigate the national and international developments from the perspective of the Treaty system. The main points of the results of the evaluation study carried out are presented in this book. They are described in detail in the summary reports, in ch. 2. The complete reports are presented in ch. 4, and cover the following fields: political issues; geosciences; marine and atmospheric sciences; human and medical sciences; and technical and commercial aspects.

A-55072

Alberts, F.G., ed, **Geographic names of the Antarctic. Second edition 1995,** Washington, D.C., U.S. National Science Foundation, 1995, 834p., PB96-134 887.

The new edition of this gazetteer contains 12,710 names approved by the United States Board on Geographic Names and the Secretary of the Interior for features in Antarctica and the area extending northward to the Antarctic Convergence. Included in this geographic area, the antarctic region, are the off-lying South Shetland Islands, the South Orkney Islands, the South Sandwich Islands, South Georgia, Bouvetøya, Heard Island, and the Balleny Islands. These names have been approved for use by U.S. Government agencies. This publication, which supersedes previous Board gazetteers or lists for the area, contains names approved as recently as Dec. 1994.

A-55073

Australia. Dept. of the Arts, Sport, the Environment and Territories. Antarctic Division, **1993-98 ANARE research support plan, with key information for planning proposals for the 1993-98 antarctic research programs,** Hobart, Australia, Nov. 1992, 49p.

This booklet provides details of support likely to be available to researchers participating in Australia's antarctic program during the summer of 1993-94 and the winter of 1994. It is pointed out that it is the Antarctic Division's intention that the voyage and other support details provided for the first two years of the five-year plan (1993-94 and 1994-95) will remain as firm as possible so that researchers may use these schedules with some confidence when developing their projects. However, it is not possible to guarantee shipping schedules; operational and other factors may require some changes as each season progresses. The details for the remaining three years (1995-96 to 1997-98) provide an indication of support expected to be available. However, these schedules will be subject to review in the 1993 and subsequent planning processes.

A-55104

Reynolds, J., **Land of ice and fire,** *Geographical magazine,* Nov. 1995, 67(11), p.38-39.

This brief essay provides some highlights in the history of Deception Island, one of the Shetland Islands, and one of the few volcanic islands of Antarctica. Small location maps are included along with photographs of fur seals and chinstrap penguins at the shore; the remnants of a whale blubber rendering plant; and a ship entering Neptune Bellows on a calm day.

A-55167

Andrews, M., **From card catalog to computer file: the impact of technology on the production of polar bibliographic databases,** *Geoscience Information Society. Proceedings,* 1994, Vol.25, p.13-19, 10 refs.

DLC QE48.85.G43 1994

The impact of technology on the production of polar bibliographic databases, which contain significant amounts of geoscience information, is traced from print to Internet. Catalog cards, printed book catalogs, and printed abstracts and indexes evolved in the late 1970s and early 1980s from computer-produced printed services into commercial online databases. The personal computer, which arrived in the mid 1980s, allowed widespread access to polar databases online and from 1989 on to CD-ROM. The global search capability on CD-ROM files evidenced a significant amount of duplication among separately produced databases, raising concerns about efficient use of resources. It also became apparent that a significant amount of the polar regions literature was escaping effective bibliographic control. Specific instances of overlap and of lack of coverage were identified on *PolarPac* and *Arctic & Antarctic Regions,* and a plan was formulated to distribute responsibilities for indexing and accessioning the polar regions literature found on these CD-ROMs. The Internet is providing the technology for a current file to be maintained by the database producers, offering real-time access by institutional clientele at the same time as the database producers cooperatively build an international bibliographic database with reduced duplication and enhanced coverage.

A-55185

Sweitzer, J.S., Brass, C., Harper, D.A., Hawkins, L., Kron, R.G., Whitt, A.S., **Educational outreach programs at the Center for Astrophysical Research in Antarctica,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.60-63, 7 refs.

The Center for Astrophysical Research in Antarctica conducts various educational outreach programs as part of its mission as a National Science Foundation Science and Technology Center. The method behind the outreach programs is one of forging partnerships between Center researchers and other educational organizations. The main program serves primary and secondary students in Chicago. The core of the program is called Space Explorers and is targeted at high school students. These students attend a summer residential institute at the University of Chicago's Yerkes Observatory. The high school Space Explorers then extend the reach of the program during the academic year by teaching in primary schools using a portable planetarium. The Center also pursues many other outreach activities and is in the process of forming an Antarctic Education Alliance. (Auth.)

A-55203

Falklands surveys resume with pincer movement, *Offshore engineer,* Feb. 1993, p.28.

GECO-PRAKLA, a division of Schlumberger, is commencing a seismic, gravity and magnetic survey of an offshore area southwest of the Falkland Islands in an exploratory effort to locate likely subsea hydrocarbon reservoirs. Licensing rights were awarded by the United Kingdom.

A-55212

Yates, J., Cunningham, P., Smith, D., **Polar hydrocarbon technologies: future developments,** *Marine policy,* Sep. 1995, 19(5), p.419-436, 35 refs., shown as footnotes.

This paper addresses the physical and technological difficulties inherent in the extraction of marine hydrocarbons in the polar regions. The factors are then analyzed to assess the potential for the transfer from the Arctic to the Antarctic of current and emerging systems of technology. The paper begins with a review of the physical environment of the polar regions, and the technology currently employed in the Arctic for hydrocarbon exploration. It then analyzes the problems concomitant with the transfer of current and emerging technologies in the Arctic to the Antarctic. The paper is purely speculative; the authors fully concur with the terms of the current Antarctic Treaty which does not allow the extraction of any resources for at least 50 years, and would hope to see this extended if possible. (Auth.)

A-55231

Castellví, J., ed, **Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings** [Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989], Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, 379p., In Spanish with English summary. Refs. passim. For selected papers see A-55239, A-55274, B-55235 through B-55238, B-55240 through B-55246, B-55248, B-55249, C-55255, C-55256, E-55247, E-55257 through E-55261, E-55268, G-55271, H-55272, H-55273, I-55250 through I-55253, J-55232 through J-55234, J-55254, J-55275, L-55262 through L-55267, L-55269 and L-55270.

DLC G845.S93

This is a collection of papers presented at the 3rd symposium on Spanish antarctic activities, reporting results of investigations conducted by Spanish scientists, sometimes in collaboration with scientists from other countries, during various antarctic expeditions, mostly in the vicinity of Juan Carlos I Station. The papers are representative of various fields of interest, which cover oceanography, glaciology, atmospheric and terrestrial physics, meteorology, geology and biology, including marine and medical sciences.

A-55239

Sobrino, I., **Spatial distribution of krill during the "Antártida 86 11" expedition** [Distribución espacial del krill (*Euphausia superba,* Dana 1852) obtenida durante la campaña "Antártida 86 11"], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.80-85, In Spanish with English summary. 10 refs.

DLC G845.S93

During the cruise "Antartida 86 11" the B/FB *Nuevo Alcocero* carried out experimental fishing tows along the Scotia Arc with two kinds of fishing gear: pelagic and semipelagic. The pelagic trawls had krill as target species. In this paper, results on krill catches are analyzed, calculating the efficiency in Kg/0.5 hours of trawl per cast. Results show 2 areas of different krill concentrations around the Orkney Is., 2 other areas around Elephant I., and 4 areas along the northern shores of the South Shetlands. No significant krill concentrations were found in the Bransfield Strait.

A-55240

Sobrino, I., **Percentage of gravid female krill found during the "Antártida 86 11" expedition** [Analisis de los porcentajes de hembras fecundadas de krill (Euphausia superba Dana, 1852), obtenidos durante la campaña "Antártida 86 11"], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.86-93, In Spanish with English summary. 9 refs.

DLC G845.S93

A total of 165 krill-fishing pelagic trawls were carried out during the cruise "Antartida 86 11" in the area of the South Orkney Is., South Shetland Is. and Elephant I. The proportion of gravid female krill in relation to the total of the sample in each catch is presented. This paper analyzes the results obtained, grouping the trawls according to the areas of maximum densities observed as well as a function of the fishing season (from Dec. 19, 1986 to Feb. 2, 1987). (Auth.)

A-55274

Pastor, X., Toribio, M.L., **Antarctic conservation and international cooperation** [La conservación de la Antártida. Un problema de cooperación internacional], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.372-376, In Spanish with English summary.

DLC G845.S93

The authors argue that the increasing interest in the Antarctic has led to an increment of the human presence in the continent which, together with the lack of adequate planning, has caused considerable damage to its vulnerable ecosystems. This makes a reorganization of management of installations in Antarctica necessary, giving priority to the minimization of the environmental impact. It is concluded that the biggest threat comes from the possibility for mineral and oil exploitation. It is suggested that the prohibition of such activities, and the declaration of Antarctica as a World Park, will safeguard the future of the last continent. (Auth. mod.)

A-55287

Mielke, J.E., **Polar research: U.S. policy and interests,** *CRS report for Congress,* July 1, 1996, 96-582 SPR, 6p.

Efforts to reduce the federal budget deficit have resulted in closer scrutiny of many programs and reexamination of U.S. policy interests. Polar research funding is one expression of U.S. policy that has not escaped this review. The United States has policy interests in both poles: in Antarctica to support the Antarctic Treaty in preserving the continent for peaceful purposes as a laboratory for scientific inquiry, protecting the environment, and fostering cooperative research; and in the Arctic for national security, rational development with minimal environmental or adverse social impact, and scientific research. These interests have developed over time through the course of events that led to their present expression in the U.S. Polar Programs of the National Science Foundation, and to the creation of the Interagency Arctic Research Policy Committee and the U.S. Arctic Research Commission. This report summarizes the development of U.S. research interests in the Arctic and Antarctic and reviews their current funding levels.

A-55291

Walker, R.S., **Antarctic Environmental Protection Act of 1996. Report 104-593, Part I,** Washington, D.C., U.S. Government Printing Office, 1996, 64p.

The report comprises the text of H.R. 3060 and the results of actions by the House Committee on Science to amend the Antarctic Conservation Act of 1978 and the Antarctic Protection Act of 1990, as necessary, to bring them into conformity with the Antarctic Protocol of 1991 on Environmental Protection to the Antarctic Treaty. This was the mark-up session to review the amendments and make further changes if necessary. Under an unusual aura of agreement, no additional changes were made, the bill was approved, and the Chairman was urged to bring it before the House for consideration.

A-55292

U.S. Congress. House. Committee on Science, **Hearing before the Committee on Science, House of Representatives, One Hundred Fourth Congress, Second Session, on H.R. 3060, The Antarctic Environmental Protection Act of 1996, April 18, 1996, [Serial No. 42],** Washington, D.C., U.S. Government Printing Office, 1996, 37p.

The occasion for the Hearing was to receive testimony on the bill to provide the implementing legislation for the 1991 Protocol signed in Madrid which, among other things, prohibits mineral exploration in Antarctica for other than scientific purposes. Witnesses included Dr. Neal Lane, NSF; Ms Eileen Claussen, U.S. Department of State; Ms Kathryn Fuller, World Wildlife Fund; and Dr. Robert Rutford, University of Texas at Dallas. They all spoke strongly in favor of the bill and individually knew of no one who opposed it. Members of the Science Committee were invited to give their opinions on the bill. All spoke highly of it; they also knew of none who opposed it.

A-55296

Duquin, G., Puurunen, H., **New areas for cooperation - Logistics, communications, research, tourism,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.23-32.

Four areas for new international cooperation in Antarctica are identified and discussed: information, logistics, scientific research, and cooperation among the Antarctic Treaty Consultative Meeting, the Scientific Committee on Antarctic Research, and the Council of Managers of National Antarctic Programs. Also pointed out in the conclusion is the need for cooperation between arctic and antarctic science research.

A-55297

Richardson, M., Vericad Corominas, J.R., **Directions of scientific research,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.33-42.

This discussion on where science is going in Antarctica focuses on scientific priorities, scientific cooperation, duplication of science, quality of science, and implementation of the Madrid Protocol in all antarctic concerns. In the conclusion, it is argued that it is really not necessary to maintain the level of human presence in Antarctica; it is proposed that the right direction might be to automate many of the facilities and monitor them through remote control.

A-55299

Rutford, R., Granow, D., **Relations between elements of the Antarctic Treaty System,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.57-68.

The debate centers mainly on the issue of the relationship between the Council of Managers of National Antarctic Programs (COMNAP) and the Antarctic Treaty Consultative Meeting (ATCM). Different views are expressed, with recognition of COMNAP's achievements and criticism of its independence. Also discussed is the relationship among different elements of the Antarctic Treaty System and their interdependence, along with the development of Treaty institutions and the problems of institutionalization of the system.

A-55300

Tornberg, W., Vidas, D., **Environmental management in the Antarctic under the Madrid Protocol,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.69-83.

This debate centers on the ratification and implementation of the Madrid Protocol, and a number of questions are raised concerning the effectiveness of the Protocol. In the final analysis of how successful the Protocol is in providing protection for the antarctic environment, it is concluded that, in comparison with other regimes, it is very successful.

A-55358

Santiago de Chile. Instituto Antártico Chileno, **Boletín Antártico Chileno, Vol.15, No.1,** May 1996, 45p., In Spanish. Refs. passim. For selected papers see A-55359, D-55362, F-55361 and M-55360.

This bulletin deals with the following: the project "Ecology of three species of pygoscelid penguins" on Ardley I.; a museum project on Deception I.; the Madrid Protocol and its contribution to the consolidation of the antarctic regime; weather observations in the Patriot Hills in 1995; national activities, such as the INACH expedition to the Patriot Hills in Nov.-Dec. 1995, and the INACH 32nd Antarctic Scientific Expedition of 1995-1996; and international activities, including meetings and SCAR and COMNAP workshops on environmental protection.

A-55359

Muñoz, G., **Museum in Antarctica** [Museo en la Antártica], *Boletín Antártico Chileno,* May 1996, 15(1), p.5-8, In Spanish with English summary.

The project for a museum on Deception I., sponsored jointly by INACH and the Norwegian Government, was started in the austral summer of 1996. The aim is to recover and preserve a whale settlement which was operating on the island at the beginning of the 20th century. Historical aspects and the original plan, including amplification of the existing buildings, are reviewed. The island in general, and the selected site in particular, are described. A proposal for future management and architectural aspects of the project are outlined.

A-55366

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.4,** 1996, p.22-28, In Italian and English.

This issue contains two articles pertinent to Antarctica, one dealing with wind effects on the McMurdo Dry Valleys, the other with the feeding behavior of King penguins on Crozet Is., monitored by small microtransmitters attached to the birds.

A-55381

Bubenheim, D.L., Flynn, M.T., Lamparter, R., Straight, C.L., **Remote sites as analogs for lunar and Mars habitat pilot studies,** *Society of Automotive Engineers. SAE technical paper series,* 1994, No.941455, 8p., Presented at the 24th International Conference on Environmental Systems and 5th European Symposium on Space Environmental Control Systems, Friedrichshafen, Germany, June 20-23, 1994. 19 refs.

The antarctic continent is of great analog value to NASA in the area of planetary exploration. The Amundsen-Scott Station is of particular relevance to habitat development. The Station offers great fidelity in resemblance to NASA missions; an effective infrastructure is already in place to support activities, and implementation of NASA-derived technologies can improve the quality of life for Station inhabitants and reduce the environmental impact of human activities on the antarctic continent. These technologies can also address important issues facing remote communities around the globe. (Auth. mod.)

A-55384

Mayewski, P.A., ed, **Science and implementation plan for the US contribution to the International Trans Antarctic Scientific Expedition (ITASE),** Washington, D.C., US ITASE, 1996, 30p. + append., Draft 960207, Refs. p.22-29.

The primary area of geographic focus chosen for US ITASE activities was West Antarctica because of the long-standing US research effort in this region. It is a multi-disciplinary research plan that integrates meteorology, remote sensing, ice coring and surface glaciology and geophysics. A four-phase approach to this integration includes meteorological modeling and remote sensing, used to plan sampling strategies conducive to the major objectives of US ITASE; ground-based sampling over 3 regions in West Antarctica, which are currently identified in a general sense as corridors; the continuation of ground-based sampling at a limited number of key sites where monitoring is required; and interpretation and modeling.

A-55387

Collinge, I., Burkitt, D., **Britain's antarctic heritage,** *NERC news,* Summer 1996, p.25-27.

The importance of early British scientific research in Antarctica has been recognized by the designation of four former stations as Historic Sites and Monuments under the Antarctic Treaty System. The conservation and renovation project of the first of these stations, Port Lockroy, is described. The history of Britain's involvement in Antarctica and some features of the UK Antarctic Heritage Trust are briefly reviewed.

A-55389

Bacigalupi, L., ed, **Italian National Antarctic Research Programme: list of publications 1986-1994,** Rome, ENEA - Antarctic Project, 1996, 164p.

This list of the Italian National Antarctic Research Programme publications (ANT 96/05) is an updating to 1994 of previous lists issued in July 1990 (ANT 90/8) and in Sep. 1992 (ANT 92/14). It comprises papers by authors whose research projects were carried out within the framework of the Italian program. The references are arranged by 11 subject areas, based on the particular structure of the Italian research projects which are grouped under different main topics. Within each section, items are arranged alphabetically by the first author, followed by year of publication, title of the article, journal title, volume number, and pagination.

A-55390

International Association of Antarctic Tour Operators, **IAATO News, July 1996,** New York, 1996, 12p.

This issue contains miscellaneous news on travel to Antarctica, including related features such as environmental protection, transportation, training programs, guide books and conservation activities. The Agenda on IAATO Meeting scheduled July 10-12, a report of the 20th Antarctic Treaty Consultative Meeting, held Apr. 29-May 10, 1996; a preliminary estimate of seaborne antarctic tourism, 1996-1997; and the IAATO Membership Directory, June 1996, conclude this issue.

A-55391

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.5,** 1996, p.29-34, In Italian and English.

The articles pertinent to Antarctica in this issue consist of a review of antarctic marine and terrestrial biology and brief news items covering the Cape Roberts drilling project; the monitoring of sea surface temperatures with sea birds; the shutting down of Vostok Station after a convoy carrying fuel and supplies broke down and had to turn back; and concern about the effects of tourism on the breeding population of Adélie penguins.

A-55392

Hooper, M., **Ignoring of Antarctica,** *Round Table,* 1996, Vol.337, p.63-72.

Groups of people are very knowledgable about the Antarctic, but there are many who know little about it. This article is for those to whom Antarctica is unfamiliar. It offers explanations for the lack of knowledge and argues that increased understanding has advantages, not least to the Commonwealth. 'The Antarctic' is usually taken to mean the area containing the continent and the islands, ocean and ice surrounding it. There is no actual boundary to this enormous region. An invisible, shifting boundary lies in the ocean around 50°S where the water temperature changes. The Antarctic Treaty defines another possible boundary: all the land, ice shelves and sea, south of 60°S. Sometimes the term 'Antarctic' means the continent itself. The continent is known as 'Antarctica' but that is also used for the whole region. (Auth.)

A-55395

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Bibliography of New Zealand Antarctic Research Programme Publications. Vol.2,** Christchurch, 1985, 76p.

The Bibliography of New Zealand Antarctic Research Programme Publications vol.2 comprises references to papers by authors whose research projects have been carried out under the aegis of the New Zealand Antarctic Research Programme. This volume is a compilation of supplements 1-3 (issued 1977-1982) together with additional material issued in 1983 and 1984. The references are arranged under subject headings based on those used by the Antarctic Bibliography. Within each section, items are arranged alphabetically by the first author, and an author index is supplied at the back.

A-55396

Antarctic Society of Australia, **Newsletter, No.43, Dec. 1995,** Pymble, New South Wales, 1995, 20p., Refs. p.7-11.

This issue consists of an article examining the early signs of global climate change, and various news items, including such topics as environmental damage that could be caused by commercial fishing off Macquarie I., construction of an ice airfield at Mawson Station, Minke whale hunting and harvesting, expressions of interests for projects proposed for ANARE 1997-2002, the Antarctic Protocol, and a conference on the conservation of albatrosses.

A-55397

Antarctic Society of Australia, **Newsletter, No.44, Mar. 1996,** Pymble, New South Wales, 1996, 20p.

This issue consists of brief news items concerning the following: the status of ratification of the Madrid Protocol, suggestions of reducing costs for research at Amundsen-Scott Station, the shutdown for the winter of Vostok Station, the new marking of the South Pole position, the National Science Foundation construction plans for a new South Pole station, concerns over the effects of global warming, a deeper ozone hole, potential for astronomical research in Antarctica, the pharmaceutical industry's interest in antarctic plants and microorganisms, colonies of bryozoans swimming in the Weddell Sea, the southern ocean fisheries, and Australian involvement in human impact research in the Larsemann Hills. The issue concludes with the 1995/96 Greenpeace World Park Base monitoring report, and suggestions for standard methods for environmental monitoring in the Antarctic.

A-55409

Scientific Committee on Antarctic Research, **SCAR bulletin No.122, July 1996,** *Polar record,* July 1996, 32(182), p.272-291.

This bulletin contains a report on 13 items discussed at the meeting of the SCAR Executive Commitee held in Siena, Italy, on Sep. 16-20, 1995. The topics include global change and the Antarctic, antarctic data management, COMNAP and SCALOP workshops, Groups of Specialists and Working Groups on environmental affairs and conservation, SCAR and AT meetings, relationships with ICSU and other bodies, finance, SCAR strategy and functions, and recommendations concerning biogeochemical flux studies. Annexes to the Measures (Management Plans for protected areas) adopted at the 19th Antarctic Treaty Consultative Meeting are reproduced in this issue.

A-55421

New Zealand Antarctic Programme (NZAP), **Report 1995/1996,** Christchurch, 1996, 36p., Refs. p.30-34.

The report presented shows that over the 1995-1996 period, NZAP has supported a range of antarctic activities. Science and environmental management have been the major focus. Projects range from studies of the upper atmosphere and ozone layer to preparations for drilling the sea floor deep below the summer sea ice of the Ross Sea, and from the population dynamics of penguins to microscopic organisms living at close to 30°C in solar-heated "glasshouse" lakes in the cold desert environment of the McMurdo Dry Valleys.

A-55423

U.S. National Science Foundation. USAP, **Antarctic research: program announcement and proposal guide,** Washington, D.C., [1992], 46p., NSF 93-49, Refs. p.9.

This 1992 brochure summarizes antarctic research opportunities, describes support available in Antarctica, explains how to prepare a proposal for research project support, provides worksheets to be used in preparing the proposal, and suggests sources of further information.

A-55424

Antarctica New Zealand, **New Zealand's future in Antarctica,** Christchurch, 1996, 12p.

This brochure outlines the different functions of the new organization *Antarctica New Zealand*, created by the New Zealand Antarctic Institute Act 1996, and based in Antarctica at Scott Base. One page of the first issue of Antarctica New Zealand news, dated July 1, 1996, describing the organization's beginning, management and mission and goals, is included.

A-55436

Smith, R.C., et al, **Palmer LTER: a long-term ecological research program at Palmer Station, Antarctica,** *Oceanography,* 1995, 8(3), p.77-86, 48 refs.

The conceptual diagram of the ecosystem and the annual time-lines of key physical and biological components provide an initial construct for defining air-ocean-ice-ecosystem and trophic-level linkages. The interannual variability in sea ice coverage allows us to "conduct" natural experiments on the impact sea ice has on various trophic levels by monitoring parameters and processes during and after seasons/years of different sea ice coverage. Prior to the Palmer LTER, there were few systematic long-term, large-scale studies in Antarctica that would allow one to distinguish secular trends from cycles and to evaluate interannual variability inherent in the system. Palmer LTER research encompasses short and long time scales as well as fine and regional spatial scales and thus is poised to resolve ecosystem dynamics and linkages in addition to providing a historical long-term database for future ecosystem studies in this region.

A-55477

Law, P., **Australian geophysical research,** *Institute of Physics. Bulletin,* Oct. 1958, p.262-266, Bibliography p.264-265 (p.4-5).

The Australian antarctic research program prior to the IGY is briefly outlined. Heard I. station was established in December 1947 and that at Macquarie I. in March 1948. Macquarie still operates; Heard closed in March 1955. Mawson and Davis Stations were set up in February 1954 and January 1957, respectively. All three will participate in the IGY. Mawson will have programs in meteorology, radiophysics, aurora, geomagnetism, glaciology, seismology, gravity observations, and cosmic rays. Davis will be limited to meteorology and aurora. Additionally, 50 miles west of Mawson, Taylor Station (winter only) will make surface observations and pilot balloon flights four times daily; and an automatic weather station 1,700 miles east of Mawson, set up in January 1958, is expected to remain operational for 12 months.

A-55478

Wexler, H., **Antarctic research during the International Geophysical Year,** Antarctica in the International Geophysical Year. Geophysical monograph no.1, Washington, D.C., [American Geophysical Union], 1956, p.7-12, 4 refs.

During 1957 and 1958 a dozen nations will maintain 40 geophysical stations in Antarctica. Thus this Continent, the fifth largest in the world, will be subjected to concentrated, coordinated geophysical exploration to a degree not dreamed possible a few years ago. For the first time, geophysical stations will be established for an extended period of time well away from the coasts, deep in the interior of the Continent. Scientists from the participating nations will cooperate in examining the composition, structure, winds, temperatures, and electrical properties of an atmosphere cut off from sunlight for many months. The thickness of the ice will be surveyed for indications of changes in volume to determine if antarctic climate is changing. The breakup and movement of the peripheral ice will be studied as a function of wind and ocean currents. The aurora australis will be studied and compared with its Northern Hemisphere counterpart. Intensive measurements will be made of geomagnetism, cosmic rays, airglow, and the ionosphere, in an attempt to throw light on the physics of the high atmosphere. (Auth.)

A-55506

Loewe, F., **Heart of the Antarctic—from the atmosphere through the ice to the rocks** [Das Herz der Antarktis - vom Luftraum durch das eis zum Fels], *Der Akadamie der Wissenschaften und der Literatur. Jahrbuch, 1969,* [1970], p.243-254, In German. Presented at the plenary session of the Akademie, October 11, 1969.

This presentation to the Akademie members summarizes mankind's knowledge of Antarctica as it stood twelve years following the events of the IGY. It reviews the known antarctic history from the Renaissance period up to the mid-20th Century. The primary emphasis is on the cold, the ice, daylight and darkness; how man coped with these severe conditions and learned how to examine this harsh sector of the world, to discover its physical aspects, and how to relate them to the rest of Earth.

A-55507

Macpherson, A.J., **Glaciological, oceanographic and sedimentological data from the Mackay Glacier and Granite Harbour region, Antarctica,** *Victoria University of Wellington. Geology Board of studies. Publication,* Mar. 1987, No.1, Victoria University of Wellington. Antarctic Data Series No.12, 81p., 22 refs.

This publication presents a range of glaciological, oceanographic and sedimentological data from the Mackay Glacier and Granite Harbour, on the coast of Victoria Land. The data were gathered between 1981 and 1985 by expeditions from Victoria University of Wellington and are the basis of a PhD thesis by the author. The thesis attempts to quantify the sediment flux into Granite Harbour in order to help understand the processes of transport and deposition in a marine polar setting. Other related studies focussed on McMurdo Sound oceanography, sedimentation in McMurdo Sound, the geochemistry of cores from Granite and New Harbours, modern benthic foraminifera in the McMurdo Sound area (including Granite Harbour), and suspended sediment beneath annual sea ice in the McMurdo Sound area. (Auth. mod.)

A-55508

ANARE Club, **Aurora, June 1996, Vol.15, No.4,** Melbourne, 1996, 32p.

The articles and news items in this issue deal with the following: plans for ANARE's 50th anniversary commemoration; the description of a journey to Antarctica on one of New Zealand's 1994-95 tourist flights, resumed after the hiatus following the Air New Zealand disaster of 1980; memories of the crash of the Neptune P2V aircraft at Wilkes in 1961; ANARE wintering expeditioners at Mawson, 1954-1995; the Amery Ice Shelf glaciological marker snowpoles; a visit of the Russian ship *Ob* to Macquarie Station in 1956; miscellaneous news items; and some memories of Casey Station first year operations in 1969.

A-55529

Stephen, N., **Keynote address: the Antarctic, the law and conservation,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.5-15, 6 refs.

The history of Australia's involvement in the Antarctic is reviewed; the Australian legislative activity relating to Antarctica is discussed; and the importance to Australia of the conservation and protection of Antarctica is examined.

A-55530

Handmer, J., Dovers, S., Wilder, M., **Australian approaches to Antarctic conservation: an historical perspective,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.17-40, Refs. p.31-34.

In this chapter the authors explore the evolution of the relationship between humanity and the antarctic environment, within the context of Australian history. The relationship has both physical and intangible aspects; these are manifested through the exploitation of the biophysical resources of the region and perceptions of the environment. Based on this historical review, the authors make a number of observations which appear to have relevance for a conservation strategy for the continent. A chronological list of AAT conservation legislation is appended.

A-55533

Powell, D., **Antarctic fishing and its likely development,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.75-89, 3 refs.

At present, antarctic fishing is focussed mainly on a few species of finfish and on krill. The fish are taken around South Georgia in the South Atlantic, and around Kerguelen and Crozet Is. in the southern Indian Ocean. Antarctic krill are harvested mainly in the South Atlantic. Apart from French control of the Kerguelen and Crozet Is. regions, regulation of antarctic fishing is achieved through the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). CCAMLR is an international organization involving some 26 countries. The organization has adopted measures regulating all fishing currently undertaken in antarctic waters and has put in place a process requiring its members to provide information allowing assessment of the impact of all new fisheries at the planning stage. (Auth. mod.)

A-55534

Herr, R., **Antarctic tourism: Australia, regulation and the industry,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.91-107, 20 refs.

Tourism is currently one of only two recognized commercial uses of Antarctica. Yet, by almost any standard it is a very modest enterprise—one that would scarcely attract more than local attention were it located anywhere else in the world. This chapter examines two aspects of the extraordinary interest which antarctic tourism has attracted in recent years. The first issue concerns the reasons for the energy and effort which have gone into the assessment of antarctic tourism, particularly since the Madrid Protocol. The second part of the chapter focuses on the possible consequences of this interest in antarctic tourism. It is argued that the changes which have occurred with the Madrid Protocol have altered the Treaty's approach to human impacts in a way likely to prove favorable to tourism in the longer term. (Auth.)

A-55536

Fletcher, N., **Antarctic science and its likely directions,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.149-160, 2 refs.

In this chapter, the author tries to provide answers to two questions: Why science in Antarctica, and What science in Antarctica. Three priorities, recommended by the Antarctic Science Advisory Committee (ASAC), are discussed on the basis of which resources to science projects should be allocated, stressing the need that research programs be well defined in terms of their scientific objectives. It is concluded that the presence of an ASAC representative on the Antarctic Conservation Strategy Steering Committee should ensure that there is a close and significant link between the conservation strategy that is developed and the objectives, strategies and programs of the Australian antarctic science program.

A-55591

Alesi, D., ed, Morani, E., ed, **National Antarctic Research Program—Antarctic Project Library: catalogue of monographs** [Programma Nazionale di Ricerche in Antartide - Biblioteca Progetto Antartide: catalogo delle monografie], Rome, ENEA - Antarctic Project, 1996, 112p., In Italian and English.

The Antarctic Project Library of the Italian National Antarctic Research Programme (PNRA) was established in 1985, and is located in the ENEA Casaccia (Rome) Research Centre. It collects technical and scientific documentation on Antarctica, and is in constant touch with other national and international antarctic libraries and research centers. The Library consists of four sections: books (Dewey Decimal Classification is used in most cases); gray literature (booklets, offprints, internal reports), classified by subject; National reports by SCAR (Scientific Committee on Antarctic Research) members; and periodicals. Short descriptions of books and gray literature (of over 50 pages) are provided. The catalog includes the authors' alphabetical and analytic indexes.

A-55605

Australia. Antarctic Science Advisory Committee, **Air Transport Options Workshop, to be held at the Antarctic Division, Hobart, Wednesday, 1 March 1995,** Hobart, [1995], var. p.

The Air Transport Options Workshop's scheduled agenda covers the following 6 areas to be considered: purpose and structure of the meeting, scientific benefits of an intercontinental system, basic operation of an intercontinental system, possibilities for an intercontinental system, working group sessions, and reports and conclusion of the meeting. Material relevant to the discussions is included.

A-55611

U.S. National Science Foundation, **Antarctic journal of the United States, Vol.27, No.3,** Washington, D.C., 1992, 24p.

This issue begins with a detailed report on a US geophysical project, planned for the 1992-1993 austral summer, to bring advanced robotic technology to Mount Erebus to directly measure volcanic gas emissions and make observations inside Erebus' two craters. Additional information provided consists of an extensive account of planned research projects in 1992-1993 in many disciplines; a table with operations highlights in continental Antarctica for the summer of 1992-1993; a table with ship schedules for the Antarctic Peninsula region, 1992-1993; a listing of USAP environmental documents on STIS; weather summaries for McMurdo, Palmer and Amundsen-Scott for the period May-July, 1992; and an article on architectural competition to provide new design concepts for McMurdo Station.

A-55630

U.S. National Science Foundation, **Antarctic journal of the United States, Vol.30, No.1-4,** Washington, D.C., 1995, 47p., Refs. passim. For selected papers see A-55631, A-55633, A-55640, B-55634, F-55632, F-55635 through F-55639 or 50-6500 through 50-6507.

This issue contains 7 articles reporting on antarctic glaciological research and one on environmental protection and microbiology; an article describing activities at the Arctic and Antarctic Research Center during 1994-1995; and an article on a new committee for the oversight of antarctic research vessels. The rest of this issue consists mainly of news items concerning the National Science Foundation and the Antarctic Journal of the United States; a list of US support and science personnel wintering over at McMurdo, Amundsen-Scott and Palmer stations; the reorganization of the Office of Polar Programs; Foundation awards of funds for antarctic projects from Sep. 1994 through Aug. 1995; and weather summaries for McMurdo, Palmer and Amundsen-Scott for the period Nov. 1994 through Oct. 1995.

A-55631

Simarski, L., **Science news from The Ice: highlights from the 1994-1995 austral summer,** *Antarctic journal of the United States,* 1995, 30(1-4), p.4-7.

The highlights of the 1994-1995 summer research season provide information on the fossil discovery on Seymour I. of, among others, a gigantic mollusc and an oversized ancestor of the modern-day armadillo; a new instrument to study very high stratospheric clouds; an unusual display of autumn bloom in ice algae from the Weddell Sea; the ice drilling at Vostok Station passing the 3000-m depth; and the hunt for meteorites in Antarctica's icefields.

A-55633

Whritner, R.H., Nelson, E., Lubin, D., **Arctic and Antarctic Research Center: support for research during 1994-1995,** *Antarctic journal of the United States,* 1995, 30(1-4), p.10-12, 3 refs.

Since 1988, the Arctic and Antarctic Research Center (AARC) at the Scripps Institution of Oceanography has maintained viable satellite data collection facilities for the polar regions. The AARC's direct involvement with research has encompassed a wide variety of disciplines, including atmospheric science, polar oceanography, sea-ice research, glaciology, geophysics, polar biology, and space science. An example of AARC support for biological research is illustrated in a figure, where collared emperor penguins have been tracked by ARGOS telemetry, and where this tracking is merged with advanced very high resolution radiometer (AVHRR) 1-2 km resolution, clear-sky images, to discern sea-ice conditions associated with the animals' migratory and feeding habits. Throughout 1994-95 the AARC has provided regular sea-ice mapping support to research cruises of the *Nathaniel B. Palmer.*

A-55640

Martinson, D.G., **New committee for the oversight of antarctic research vessels,** *Antarctic journal of the United States,* 1995, 30(1-4), p.31-35.

Antarctic Support Associates (ASA), as the prime contractor to the National Science Foundation for support to the United States Antarctic Program, has established an Antarctic Research Vessel Oversight Committee (ARVOC). This article introduces the committee, describes its charge, provides information regarding antarctic research ships and their capabilities, and advertises an ARVOC-related electronic bulletin board. The latter represents a platform through which the antarctic research community and ARVOC can communicate regarding ship-related matters, such as ship scheduling, equipment acquisitions or needs, and ARVOC agenda items or announcements.

A-55648

Hatherton, T., **Science in Antarctica: intellectual and physical adventure,** *Interdisciplinary science reviews,* 1982, 7(4), p.283-295, 15 refs.

Antarctica is a geographical region and antarctic science is therefore multidisciplinary, the main areas of research being concerned with the continent's geological base, the superimposed ice-cap, the atmosphere above it and their external relationships. Each of these research areas is interdisciplinary: the study of its outstanding problem—the history of the antarctic ice sheet—requires contributions from meteorology, oceanography, glaciology, geology, chemistry and physics; and its future behavior will be determined by external events, including the consumption of fossil fuels on other continents. Research in Antarctica is given added piquancy by the continent's unique environment and rigorous climate which retain their attractive character even though modern technological developments have removed many elements of discomfort and danger. The region is also singular in its political nature and scientists have a particularly close relationship with their governments through the Antarctic Treaty. (Auth.)

A-55704

Loewenstein, R.F., **Remote astronomy at the South Pole,** Astronomical Society of the Pacific, Conference Series, Vol. 55. Optical Astronomy from the Earth and Moon: Astronomical Society of the Pacific Summer Scientific Meeting, San Diego, CA, 13-15 July, 1993. Edited by D.M. Pyper and R.J. Angione, San Francisco, CA, USA, Astronomical Society of the Pacific, 1994, p.263-266, 1 ref.

DLC QB88.A778 1993

Because of its dry, cold, stable sky, the South Pole offers distinct advantages for infrared and submillimeter wavelength astronomy. The Center for Astrophysical Research in Antarctica (CARA) has initiated four research projects to investigate the Antarctic Plateau's potential for astronomy at these wavelengths. Remote controlled and automated telescopes will be necessary to operate effectively in the harsh antarctic environment. Better communication to the South Pole, however, is required to permit real-time connections for control and data return. The remoteness and severe conditions of the South Pole offer a good analog to other remote outpost sites, such as a lunar observatory. (Auth.)

A-55705

China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988, **Proceedings** [Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji], Nanji kexue kaocha lunwenji (Collected papers on antarctic expeditions, No.6), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, 444p., In Chinese with English summaries, titles, and table of contents. Refs. passim. For individual papers see A-55743, B-55725 through B-55742, B-55744, B-55745, B-55761, E-55717 through E-55721, E-55746 through E-55756, E-55758, F-55714, I-55711 through I-55713, I-55760, J-55706 through J-55710, J-55715, J-55716, J-55722 through J-55724, J-55757, L-55759 or 50-6764 through 50-6786.

DLC G845.5.C45 1989 Orien China

This is a collection of papers based on data obtained during the First Chinese Southern Ocean Expedition in the summer of 1984-1985. The 56 studies reported in this volume were carried out in different antarctic regions, marine and continental, and in different disciplines including biology, geology, oceanography, meteorology, terrestrial physics and glaciology.

A-55743

Chen, X.Z., **Research on catching antarctic krill using a mid-water trawl with nylon canvas spreaders,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.278-284, In Chinese with English summary. 2 refs.

DLC G845.5.C45 1989 Orien China

A new midwater trawl, designed for the research vessel Jidi for krill fishing during its southern ocean exploration, is described. The new trawl, with nylon canvas spreaders instead of the traditional otter boards, shows high operating stability; the required water layer for the net can easily be reached by changing the length of the towing warps or the towing speed. The optimum towing speed for krill fishing ranges from 1.8 to 2.5 knots. For krill schools in the surface layer, best results are achieved with the trawl in water 5-15 m deep, trawling time 1-2 hours, and around midnight.

A-55792

Hatfield, E.M.C., **Towards resolving multiple recruitment into loliginid fisheries: *Loligo gahi* in the Falkland Islands fishery,** *ICES journal of marine science,* June 1996, 53(3), p.565-575, 19 refs.

Data on size structure and maturity of the commercially exploited *Loligo gahi* population in Falkland I. waters were collected by the Fisheries Department of the Falkland Islands Government for the years 1987-1991. Three methods were used to define the number of broods of squid recruiting to the commercial fishery each year. The three methods combined, using monthly data on mean size for each maturity stage, the relative proportions of each maturity stage in the population and an application of the software package "MIX", demonstrated that at least two, and more usually three, broods of squid recruit to the fishery each year. Squid recruit in Feb., Apr./May and Aug./Sep. The data also showed that there are nearly always two broods present in the first commercial fishing season and usually two broods present in the second season, with overlap of the Apr./May recruits from the first to the second fishing season. (Auth.)

A-55839

Rolland, D., Demas, T., **Oceanographic research ships of the twenty-first century,** Marine Technology Society Conference. Washington, D.C., Sep. 7-9, 1994. Proceedings. Challenges and opportunities in the marine environment, Marine Technology Society, 1994, p.556-562, 7 refs.

DLC GC2.M78

The United States Navy is currently involved in several construction programs to provide new research ships for use by the Government and by universities. In the course of designing, constructing, and operating these ships, insight has been gained in the needs, methods, and problems of modern oceanographers. Lessons learned from these programs are applied every day and will be indispensable in developing research ships of the future. This paper explores the successes and failures of these new oceanographic ship designs with an eye toward designing oceanographic ships for polar operations in the twenty-first century. (Auth. mod.)

A-55858

Edwards, K., ed, Graham, R., ed, **Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation,** Canberra, Australian Government Publishing Service, 1994, 129p., Refs. passim. For selected papers see A-55859 through A-55863, A-55865 through A-55867 and H-55864.

DLC HQ187O.7.G46 1994

This is a collection of papers presented at the conference "Living in Antarctica: Women in a Man's World", held Aug. 19-21, 1993, in Hobart, Tasmania. The presentations consist of an introduction and 9 papers, and higlights of 3 workshops, reflecting the principal objectives of the conference: to provide an historical overview of the role of women in Antarctica, analyze the mangement issues raised by the introduction of women into traditionally male arenas, examine the idea of leadership and gender differences, provide a cross-fertilization of ideas with other industries, encourage international discussion of the issue, and provide recommendations on management of men and women in future antarctic expeditions. A summary of the conference and a list of conference delegates conclude this volume.

A-55859

Lugg, D.J., **Antarctic context,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.7-11, 11 refs.

DLC HQ187O.7.G46 1994

The author attempts to set the scene for the conference by giving a visual presentation of Antarctica - the place, the stations, the people, the culture and history, work, research and analogue situations. To support his argument against the implication that "Antarctica is not a place for women", he reviews a number of cases of women successfully involved in antarctic activities, from as early as the 1930s up to ANARE 1994 recruitment of medical practitioners, where 3 of the 4 chosen were women.

A-55860

Dalmau, T., **International approaches: reflections on managing women and men in antarctic expeditions,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.13-38, Refs. p.36-37.

DLC HQ187O.7.G46 1994

Based on the author's 7 years' direct experience as a consultant with Australia's Antarctic Division, helping it with various aspects of human resource practice, the author proposes to bring a few worthwile perspectives to the organizational dynamics surrounding women living in Antarctica. He reviews data provided by various countries on the rate of participation of women in antarctic communities: as crew on vessels, women on round trips, women in summer communities, women in winter communities, and their occupations. He cites the highest percentage (52.66%) in scientific areas, the lowest (1.45%), in leadership.

A-55861
Raney, M., **Woman in a man's world: a personal and management perspective,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.39-47.

DLC HQ187O.7.G46 1994

The author describes her experiences and impressions during her wintering-over as the physician at Amundsen-Scott Station in 1979, from weather conditions to living and working facilities, to physiological and psychological reaction to cold, isolation, and the presence of women in what was then considered to be a man's world. She reports that when she returned to Antarctica 6 years later in 1987, she found significant social changes at the stations. There was greater tolerance to gender differences, in terms of management and leadership styles, attributed to the presence of women who filled many roles.

A-55862
Puskeppeleit, M., **Untold story: the German all-female overwintering party,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.49-52.

DLC HQ187O.7.G46 1994

Highlights are presented of the story of how the nine women to become the first all-female overwintering team, at the Georg von Neumayer Station in 1989-1990, got together, trained, organized, obtained support, and carried out their research in the hostile antarctic environment.

A-55863
Richardson, S., **Alternative perspective: the Defence Forces,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.53-57.

DLC HQ187O.7.G46 1994

Parallels between women in Antarctica and women in the Australian military experiences are discussed. Comparisons and contrasts are addressed, including perceptions about legislation, policy and culture.

A-55865
Law, P., **All male expeditions 1947-66,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.67-73.

DLC HQ187O.7.G46 1994

Expeditions to Australian antarctic stations between 1947 and 1966 are described, particularly the process of personnel selection which until 1959 consisted of men only. The major differences between ANARE stations in the 1950s and those today, seen in buildings, communications, sexual compositions of the parties, and behavioral patterns and psychological attitudes of the station personnel, are discussed.

A-55866
Puskeppeleit, M., **All-female expedition: a personal perspective,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.75-81.

DLC HQ187O.7.G46 1994

This is a second, more detailed presentation at the conference, by the same author and on the same subject: the wintering-over by the first all-female team at the Georg von Neumayer Station in 1989-1990. For the first presentation see ch. 5.

A-55867
Williams, L., **Observations on mixed groups in Antarctica,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.83-91.

DLC HQ187O.7.G46 1994

In discussing ANARE's sexually mixed groups in Antarctica, the process of personnel selection, including evaluation of work competence and psychological screening, is described. Drawbacks and benefits are outlined, the former including medical problems, unsuitable relationships and attachments, and the issue of shared facilities. The benefits include the 'softening' of some group behaviors on the station, and the enhancement of the net competence level of the group by its female members.

A-55887
Project 5: nature and causes of climate change over the past 20,000 years in Australia and Antarctica, Global change: a research strategy for Australia 1992-1996, Canberra, Australian Academy of Science, 1992, p.62-65.

DLC QC981.8.C5 G63

There are several sources of high resolution climate and environmental data for the past 20,000 years in the Australasia-Antarctica region. These data are little exploited although their potential is recognized. No single proxy record or site can provide the information necessary. This project therefore supports a multi-variable and multi-site approach to understanding past regional climate and environmental changes. The project developed for this research plan arose from the workshop on “Global Changes of the Past”. It is highly compatible with the Past Global Change Core Project of the International Geosphere-Biosphere Programme (IGBP). This major project covers a range of latitudinal zones, consistent with the overall objective of the Australian IGBP/World Climate Research Programme plan. (Auth. mod.)

A-55888
Project 7: circulation, heat transport and sea ice changes in the southern ocean, Global change: a research strategy for Australia 1992-1996, Canberra, Australian Academy of Science, 1992, p.69-74.

DLC QC981.8.C5 G63

Making models to successfully predict climate change is an important goal to which Australia can and should contribute, and would benefit from. This question is examined in the World Ocean Circulation Experiment of the World Climate Research Programme. Australian oceanographers have for many years helped the design and progress of this experiment with the following objectives: to determine large-scale transport and storage of heat in the oceans surrounding the continent, and the effect of the ocean circulation on sea-surface temperature; to determine air-sea fluxes of heat and greenhouse gases in equatorial waters in the western Pacific, the Indian and southern ocean; to understand the effect of ocean circulations on carbon storage in deep water, and on exchanges of CO_2 with the atmosphere at the ocean surface; to determine rates of formation and subduction of thermocline waters and the rate at which this carries heat and greenhouse gases away from the surface layer, especially in the mid-latitude regions of the Indian and South Pacific oceans; to build a long-term observational strategy to detect subtle changes in heat storage of the oceans; and to develop and validate ocean models assisting prediction of climate change. These goals necessitate substantial cooperation with overseas researchers. (Auth. mod.)

A-55889
Antarctica, 12-13 February 1990, Global change: a research strategy for Australia 1992-1996, Canberra, Australian Academy of Science, 1992, p.149-153.

DLC QC981.8.C5 G63

The aims of this workshop were to: identify parts of the present Australian Antarctic program relevant to the aims of the International Geosphere-Biosphere Programme (IGBP); identify gaps in the present program; and report on possible antarctic research projects which would complement the aims of the IGBP. The meeting consisted of invited short presentations designed to stimulate cross disciplinary discussion. It was somewhat different from other workshops in that it involved a great number of disciplines focussed on a geographic region rather than a process or discipline. (Auth. mod.)

A-55969

British Antarctic Survey, **Report of the British Antarctic Survey 1994-95,** Cambridge, Natural Environment Research Council, [1995], 158p., Pubs. p.134-147.

General remarks are made concerning staff news and activities in various divisions at BAS stations; personnel awards are announced; distinguished visitors, and British and international meetings attended, are listed. Logistic and operational activities are reviewed, including ship and air operations. A science strategy plan is presented; 5 principal and 2 minor science themes provide a framework for research programs which are reviewed in detail and consist of the following: Pattern and change in the physical environment of Antarctica; Geological evolution of West Antarctica; Dynamics of antarctic terrestrial and freshwater ecosystems; Structure and dynamics of the southern ocean ecosystem; Physics of solar-terrestrial phenomena from Antarctica; Humans in isolated polar communities; and Antarctic geographic information and mapping. Included are 5 appendices providing BAS' financial background, and lists of 1994 publications and staff in various locations, divisions and ships.

A-55970

Capdevila, R., **Historic archeology in Antarctica** [Arqueología histórica en la Antártida], *Buenos Aires. Instituto Antártico Argentino. Contribución,* 1992, No.411, 28p., In Spanish with English summary. 7 refs.

The activities of the MUSEOANTAR program started during the 1979-80 summer season with work on the belongings left by the Swedish Antarctic Expedition (1901-1903) led by Otto Nordenskjöld in the area of Snow Hill I., east of the Antarctic Peninsula. This communication deals with the beginning and the development of the program, its extension to sites on Paulet I. and in Hope Bay, and the tasks that are being planned for the next seasons. (Auth.)

A-55976

Antarctica New Zealand, **1996/97 handbook,** Christchurch, 1996, 33p.

Antarctica New Zealand was established on July 1, 1996, through the passing of the New Zealand Antarctic Institute Act. It is the Government agency responsible for managing New Zealand's activities in Antarctica. This handbook provides an outline of New Zealand activities planned for the 1996-1997 antarctic research season, covering information to personnel leaving for Antarctica regarding documents, clothing, etc.; antarctic laws; living and working conditions at Scott Base; instructions how to cope with emergencies, such as fire; waste management; preparing to return to New Zealand; policies to promote safety and guide activities at Scott Base; and opportunities for individual involvement in Antarctica.

A-55985

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.6,** 1996, p.36-42, In Italian and English.

The news items pertinent to Antarctica in this issue deal with the following: Emperor penguins to be used as an indicator of environmental change from the study of their population fluctuations and ecology; the retreat of Cook Glacier and one of its tongue, the Ampere Glacier, of about 2.5 km since 1962; the discovery of ice estimated to be more than 8 million years old, in the Transantarctic Mountains, with implications that the melting risk of antarctic glaciers is less than assumed so far; and the National Science Foundation plan to use the abandoned satellite GOES-3 to link Antarctica with Internet.

A-55986

Markwitz, W., Reiniger, K.D., Gredel, J., Dech, S.W., Zimmer, A., **German antarctic receiving station,** Oberpfaffenhofen, German Remote Sensing Data Center (DFD), [1993], 17p., 20 refs.

Since 1983, the Federal Republic of Germany had been persuing plans to design and implement a transportable station for the acquisition of data from remote sensing satellites. A phase-A study, and a follow-on phase-B study had shown the feasibility of such a concept. The scenario of potential users had been investigated to identify applications. As a result, the German antarctic and the geodetic research community provided a plan justifying the implementation of a receiving station in Antarctica. All ERS SAR data acquired with the German antarctic receiving station undergo quick-look processing and are recorded on High Density Digital Tapes and later transported to the German Processing and Archiving Facility (D-PAF) for precision processing. In addition to the ERS and JERS SAR data acquisition, the station has been upgraded by DLR to also receive and record NOAA-AVHRR data. Further upgrades are planned, which will enable the data acquisition for future radar satellites, such as the Canadian Radarsat and the European Envisat. This paper briefly describes the major building blocks and functions of the German antarctic receiving station, and it outlines and describes its services and data products. (Auth. mod.)

A-55998

ANARE Club, **Aurora, Sep. 1996, Vol.16, No.1,** Melbourne, 1996, 32p.

The articles and news items in this issue deal with the following: the re-dedication of Nella Dan memorial; recent ANARE activities and plans for 1996-97; an account by a Club member of his return to Antarctica after 30 years; the Club's social events, such as dinners, reunions and meetings; book reviews and letters to the Editor; a financial report for the years 1992 to 1996; and other, miscellaneous, news items.

A-56000

U.S. National Science Foundation. Office of Polar Programs, **Antarctic journal of the United States, Vol.31, No.1,** Washington, D.C., 1996, 31p., Refs. passim.

The bulk of this issue consists of a synopsis of the 19th Antarctic Treaty Consultative Meeting, held in Seoul, May 8-19, 1995, followed by complete texts of measures, decisions and resolutions, along with associated annexes, adopted at the meeting. Other items of interest concern the U.S. Navy presence in Antarctica; a 5-year review of regulator performance in the U.S. Antarctic Program; Nobel Prize awards to pioneers in ozone research; the worst ozone depletion yet, registered during the austral spring of 1995; science news from Antarctica; monthly, Jan.-Dec. 1995, weather statistics; and a table showing the number of record-breaking days at the Amundsen-Scott Station, for low temperature and air pressure, and peak winds.

A-56001

South Pole Users' Committee Third Meeting, 04-05 April 1996, NSF Headquarters, Arlington, VA, **Proceedings,** Englewood, CO, Antarctic Support Associates, 1996, var. p.

The Third Meeting of the South Pole Users' Committee was held on Apr. 4-5, 1996, at NSF headquarters in Arlington, VA. During the two-day meeting the Committee members as well as members of some of the Working Groups addressed a wide range of issues and made plans to prepare advisory documents for the Antarctic Support Associates (ASA). A list of action items and the detailed proceedings is presented. The Committee agreed that Communications remains its top priority, while acknowledging significant progress over the past year. The Committee expanded the existing Shops Working Group to consider a wider range of science space issues, and renamed it the Facilities Working Group. The Committee also heard a presentation on the South Pole Redevelopment Project and the progress of the South Pole Traverse project. (Auth. mod.)

A-56002

National Snow and Ice Data Center, **NSIDC notes, issue No.18, summer 1996,** Boulder, CO, 1996, 6p.

The notes pertinent to Antarctica in this issue deal with a Landsat project to map ice velocities of West Antarctica; and a focused program of sea ice motion studies using instrumented buoys deployed on ice floes in the southern ocean, as near to the antarctic coastline as possible.

A-56004

Wharton, R.A., Jr., ed, Hastings, J.T., ed, **Antarctic GIS Workshop. Report of a National Science Foundation workshop held at the U.S. Geological Survey, Reston, VA, 27-29 September 1994,** Reno, NV, Desert Research Institute, [1995], 24p., 11 refs.

In Sep. 1994, a workshop on Antarctic Geographic Information Systems (GIS) was sponsored by the National Science Foundation (NSF) Office of Polar Programs (OPP) and hosted by the U.S. Geological Survey (USGS) at its Reston, VA headquarters. The purpose of the workshop was to seek consensus on the level of scientific interest in, and the concomitant requirements for, GIS in USAP, as a guide to the Office's investment in GIS technology over the next 5-plus years. At the end of 3 days of technical presentations, demonstrations, and discussions, the workshop participants reached consensus on several points. The participants recommended that a central GIS Activities Office be fostered by OPP over an initial 3-year period. This Office would take primary responsibility for antarctic framework data collection, documentation, and catalog maintenance; also, it would facilitate acquisition and installation of GIS software packages and provide associated GIS training and support to OPP grantees. In addition, the Ofice would serve as the nexus for the numerous activities which must be coordinated and linked with GIS, especially remote sensing and global positioning systems. (Auth. mod.)

A-56026

New Zealand. External Assessment Bureau, **Information on the 36th Soviet Antarctic Expedition (1990-1992),** Wellington, Mar. 1991, 22p. + appends., EAB 31/91, Translation of the 1990 official report of the USSR State Committee for Hydrometeorology, Moscow, supplied in accordance with provisions of the Antarctic Treaty.

This is a translation of the annual report on antarctic activities, 1990-1992, provided by the USSR and published by the New Zealand External Assessment Bureau. Reported are routes, names, types, numbers and armaments of ships and aircraft sent to the Antarctic, including information about military equipment and its location; names, location and dates of opening stations established or planned; personnel data; the research projects carried out and the instruments and equipment used; means of transportation and communication equipment in use; emergency shelters and medical facilities; waste removal policy; and information on radio equipment and schedules of radio links for all Soviet stations in Antarctica.

A-56027

Spain. Comisión Interministerial de Ciencia y Tecnología, **Antarctic Treaty: Spanish antarctic research program, expedition 1991-1992. Information exchange under Article VII(5)** [Tratado Antártico: Programa español de investigación antártica, campaña 1991-92. Intercambio de información segun el Articulo VII(5)], Madrid, [1991], 28p., In Spanish and English.

As exchanged information on Spanish planned activities for the summer 1991-1992, the items covered include: ship's description, itinerary and operations; Juan Carlos I Station's research facilities and logistics; telecommunications equipment and schedules; list of participating organizations and scientists; scientific projects in various disciplines and at different locations; joint projects with Germany, Argentina, Chile and Sweden; a brief note on the installation of a new refuge at the base of Queen Sophia Mountain; and the use of a floating ship-to-tanks hose to unload 15,000 l of fuel.

A-56032

Korea Ocean Research and Development Institute, **Polar Research Center,** Seoul, 1991, p.20-21, In Korean and English.

The Polar Research Center, a key part of the Korea Antarctic Research Program (KARP), carries out research on the geological evolution of Bransfield Strait, the structure and function of the southern ocean ecosystem, the fluctuation of global climate and paleoclimate and the characteristics of physical and chemical oceanography in polar regions. The Center consists of four polar research laboratories: geological, ecological, ice and climate, and environmental sciences; the Polar Logistics Department; and the antarctic King Sejong Station. Each organization has its own roles, which are outlined.

A-56033

Imagining Antarctica [Antarktis-Vorstellung und Wirklichkeit], Linz, Museum der Stadt Linz, 1986, 99p., In German and English.

Based on the tradition among painters and photographers, who have found in the antarctic landscape an unusual subject since the early days of antarctic exploration, this booklet is a creation of 22 artists whose ideas of Antarctica were presented in artwork exhibited in the Linz City Museum, June-Aug. 1986. Short articles, or essays, describe the items exhibited from different points of interest: philosophical, scientific, historic and political. The book is written in German and English; brief biographies of the authors are presented at its end.

A-56100

Moreno, C.A., Rubilar, P.S., Marschoff, E., Benzaquen, L., **Factors affecting the incidental mortality of seabirds in the *Dissostichus eleginoides* fishery in the southwest Atlantic (Subarea 48.3, 1995 season),** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.79-91, With French, Russian and Spanish summaries. 19 refs.

This paper analyzes all incidental mortality of seabirds recorded on Argentinian and Chilean vessels fishing for Patagonian toothfish *(Dissostichus eleginoides)* in Subarea 48.3 during the 1995 season. The total mortality recorded was 1,428 birds of which white-chinned petrels *(Procellaria aequinoctialis)* comprised 77.8%, southern giant petrels *(Macronectes giganteus)* 10.8%, black-browed albatrosses *(Diomedea melanophris)* 8.1%, wandering albatrosses *(D. exulans)* 2.0% and grey-headed albatrosses *(D. chrysostoma)* 0.7%. A total of 56 seabirds captured during hauling operations and released alive was also recorded. Within this group, the most abundant were *M. giganteus* (50%), *D. melanophris* (14.3%) and *P. aequinoctialis* (8.9%). A study of the variables affecting incidental mortality shows that the distance from land, and lunar phase and the use of streamer lines and hook size were important sources of variation, both in vessels' analyses of catch of birds per unit effort (BPUE), as well as of the haul-by-haul data. (Auth. mod.)

A-56101

Williams, R., Capdeville, D., **Seabird interactions with trawl and longline fisheries for *Dissostichus eleginoides* and *Champsocephalus gunnari*,** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.93-99, With French, Russian and Spanish summaries. 11 refs.

The behavior of seabirds and the rate of incidental mortality were observed during commercial trawling operations for Patagonian toothfish *(Dissostichus eleginoides)* in the 1994-95 season near Macquarie I. and Kerguelen Is. Longlining for *D. eleginoides* and trawling for mackerel icefish *(Champsocephalus gunnari)* were also observed at Kerguelen. Many seabirds were constantly observed near the vessels, especially giant petrels *(Macronectes halli* and *M. giganteus),* black-browed albatrosses *(Diomedea melanophris)* and Dominican gulls *(Larus dominicanus).* White-chinned petrels *(Procellaria aequinoctialis)* were common only at Kerguelen. Bird mortality during trawling was zero at Macquarie I. and very low at Kerguelen; most was associated with a single vessel using a netsonde cable while targeting *C. gunnari.* Most mortality associated with both longliners and trawlers was of white-chinned petrels, with a lesser mortality of albatross species. Mortality rates associated with longlining in the Kerguelen region were lower than those reported for the South Georgia area, probably because the birds at the former site are distracted from the longlines by the discharge of offal from the side of the vessel opposite to where the longline is set. (Auth.)

A-56102

Croxall, J.P., Prince, P.A., **Potential interactions between wandering albatrosses and longline fisheries for Patagonian tooth-**

fish at South Georgia, *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.101-110, With French, Russian and Spanish summaries. 16 refs.

The authors examine the extent of overlap between South Georgia wandering albatrosses *(Diomedea exulans)* and local longline fishing for Patagonian toothfish *(Dissostichus eleginoides),* using satellite-tracking data and precise haul locations, respectively. It is concluded that *D. exulans* breeding at South Georgia have a relatively low potential risk of interaction with longline fisheries around South Georgia between Dec. and Feb. (incubation period) and between late May and Oct. (main chick-rearing period). However, during the chick-brooding period, from Mar. through mid-May, adult birds of both sexes spend most of their time at sea over the South Georgia continental shelf in areas very similar to where the longline fishery operates and are therefore at serious risk from these fisheries at this time. Until fishing methods which do not catch albatrosses are in comprehensive use, it is recommended that the South Georgia longline fishery for *D. eleginoides* should be managed in such a way as to avoid fishing between the end of Feb. and mid-May. (Auth.)

A-56103

Watters, G., **By-catch of fishes captured by the krill fishing vessel *Chiyo Maru No.2* in statistical area 58 (January to March 1995),** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.111-123, With French, Russian and Spanish summaries. 16 refs.

This paper presents a brief re-analysis of the by-catch data collected on board the *Chiyo Maru No.2;* means and variances are calculated from the delta distribution. In numbers, an average of about 14 fish were caught per tonne of krill, and an average of about 25 fish were caught per hour of towing. In weight, an average of about 1.2 kg of fish were caught per tonne of krill, and an average of about 2.2 kg of fish were caught per hour of towing. Confidence intervals for mean by-catch estimates are wide suggesting that, in the future, more hauls should be sampled for by-catch. The proportion of hauls containing fish was much higher for the *Chiyo Maru No.2* than it was for other Japanese and Ukrainian krill trawlers fishing in the Atlantic sector of the southern ocean. This difference may be related to differences in the amount of krill that was subsampled for making observations on fish by-catch. (Auth. mod.)

A-56142

Australia. Cooperative Research Centre for the Antarctic and Southern Ocean Environment. (Antarctic CRC), **Annual report, 1995/96,** Hobart, Tasmania, 1996, 80p., Refs. p.58-66.

This report describes the Antarctic CRC's research objectives, its structure and management, the aims and progress in southern ocean processes research and the research sub-programs, commercialization, scholarships provided to students of the Institute of Antarctic and Southern Ocean Studies and to other higher degree students, and cooperative linkages. The report also provides information on the Antarctic CRC's staffing and administration, publications, public presentations, public relations and communication, its grants and awards, performance indicators, financial reports, and the audit report for the year ended June 30, 1996.

A-56143

Antarctic Society of Australia, **Newsletter, No.46, Sep. 1996,** Pymble, New South Wales, 1996, 20p.

The main news items covered in this issue deal with the SCAR Global Change Program Office activities; the disastrous mechanical failure that struck the Australian Antarctic Division chartered ship, the *Aurora Australis*; personnel problems at Casey Station; the US signing of a law to carry out responsibilities under an international treaty to protect Antarctica's environment; the migration north, from Antarctica, by penguin chicks; a report on the 14th meeting of the CCAMLR held Oct. 23-Nov. 3, 1995, in Hobart, Australia; results of that meeting concerning krill and fish catches in different antarctic and subantarctic areas; new and exploratory fisheries; ecosystem monitoring and management; marine mammals and birds; incidental mortality linked to trawl and longline fisheries; and geopolitical issues in the South Atlantic related to the CCAMLR's function.

A-56144

New Zealand Antarctic Society, **Polar whispers, Sep. 1996, Issue 8,** Christchurch, 1996, 4p.

This brief publication covers news of the New Zealand Antarctic Society concerning Antarctica's 4 poles: the Geographic South Pole, the Magnetic South Pole, the Antarctic Pole of Inaccessibility, and the South Geomagnetic Pole; an antarctic visitor center; the whales migrating north from Antarctica each year; funding for the Society; and activities of the Society's members.

A-56145

New Zealand Antarctic Society, **Polar whispers, June 1996, Issue 7,** Christchurch, 1996, 4p.

This brief publication covers news of the New Zealand Antarctic Society concerning the 1895 Cape Adare landing by Henrik Bull; the first antarctic musical, Great Scott; branch officers; retirements; and activities of the Society's members.

A-56146

New Zealand Antarctic Society, **Antarctic, Vol.14, No.3, Issue No.158,** Christchurch, 1996, p.81-120.

The main news items covered in this issue deal with New Zealand, United States, South Africa, Japan and Britain's antarctic activities; comments on travel to Antarctica in 1995-96 and a chart of the preliminary estimate of seaborne antarctic tourism 1996-1997. General news deal briefly with climate change, the proposed printing of 1, 5, 10 and 20 dollar antarctic notes, research on fellowship, and some biographical notes on the 1902-1904 antarctic expeditioner T.A.F. Feather.

A-56147

New Zealand Antarctic Society, **Antarctic, Vol.14, No.2, Issue No.157,** Christchurch, 1996, p.41-80.

Research activities and main news items covered in this issue deal with the following: an update of a multi-national geological drilling project at Cape Roberts; highlights of the 1995-1996 projects of antarctic expeditions carried out by India, New Zealand, Australia and the United States; and a report on the results of a survey of tourists to New Zealand's subantarctic islands and their impact on the environment. General news deal briefly with the ozone depletion, awards presented to antarctic pilots, an antarctic bibliogrpahy, and a note about the salvage attempt on Admiral Byrd's plane.

A-56148

U.S. Congress. House. Committee on Science, **Future of Antarctic research: Hearing before the Subcommittee on Basic Research of the Committee on Science, U.S. House of Representatives, One Hundred Fourth Congress, Second Session, July 23, 1996, [No.65],** Washington, D.C., U.S. Government Printing Office, 1996, 196p.

The hearing convened on July 23, 1996, to review the responsibilities of the National Science Foundation, focusing on the United States Antarctic Program and the future of antarctic research. The U.S. commitment to the Antarctic, and its role at the Amundsen-Scott Station, were the main topics addressed. The hearing was organized in two panels responding to questions from members of the Subcommittee: one consisted of representatives of the Office of Science and Technology Policy, the National Science Foundation, and the Departments of State and Defense; and the second, of two scientists representing the Polar Research Board of the National Academy of Sciences.

A-56149

Gille, J.C., ed, Massie, S.T., ed, Mankin, W.G., ed, **[Preface: The UARS experiment on data collection],** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9539-9540, For individual papers see 51-977 through 51-1003 or I-56154 through I-56156, K-56150 through K-56153 and K-56157 through K-56170.

The launch of the Upper Atmosphere Research Satellite (UARS) on Sep. 12, 1991, initiated the collection of the most complete and detailed set of observations ever attempted of the atmosphere between 15 and 100 km altitude. This volume collects 46 papers that present the evaluation of the quality of those data. Most of these papers contain data between 80°N and

80°S latitudes. Nine instruments were selected to make the measurements: three to measure energy inputs into the atmosphere, four for composition and temperature, and two for winds. A Central Data Handling Facility (CDHF) processes all data. Each instrument has a plan for the full evaluation and validation of its data.

A-56195

Bywaters, K.W., Lazzara, M., Santek, D., Young, J.T., **Antarctic data archive and access system,** International Conference on Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology, 11th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.373-375, WDCA 95000142, 2 refs.

With ever increasing volumes of satellite data available to scientists, it is becoming increasingly difficult for them to gain control of the dataset. Surprisingly, antarctic research exemplifies this problem well. Even though Antarctica has a low density of surface based observations, it is by definition, an area of high temporal and spatial coverage by polar orbiting satellites. The AMRC (Antarctic Meteorological Research Center) at SSEC (Space Science and Engineering Center) has developed a tool that logically stores the data and provides the scientist with the capability to search the database for a specified subset meeting predefined criteria. It is built on top of the Empress RDBMS (Relational DataBase Management System). Satellite data from NOAA-10, -11 and -12 are stored in the database and a convenient graphical interface provides easy point-and-click access to the system. (Auth. mod.)

A-56287

Carlowicz, M., **Presidential panel endorses U.S. role in Antarctica,** *Eos,* July 2, 1996, 77(27), p.253-254.

The United States must continue its work in Antarctica for both scientific and strategic reasons, the Clinton Administration's National Science and Technology Council (NSTC) asserted in a report issued in May. The challenge, however, will be to find a way to keep the knowledge base growing while the budget is shrinking. In the report, NSTC's Committee on Fundamental Science declared the activities and policies of the U.S. Antarctic Program (USAP) to be "appropriate at the current funding level," and endorsed a 14-year-old presidential directive to keep the U.S. "active and influential" in Antarctica. (Auth. mod.)

A-56298

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.7-8,** 1996, p.43-49, In Italian and English.

The news items pertinent to Antarctica in this issue deal with the following: the ANTARES project, which is an international hydrobiochemical research program carried out in the southern ocean last Oct.; possible evidence of past life on Mars found recently in an antarctic meteorite; and events related to the building of the first Italian antarctic station, on King George I., in 1975-1976.

A-56299

Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.9,** 1996, p.50-56, In Italian and English.

The news items pertinent to Antarctica in this issue deal with the following: The National Science Foundation long term ecological research program carried out in McMurdo Dry Valleys; the antarctic collection of meteorites; the 1996 Norwegian Antarctic Expedition, leaving Oslo on Nov. 8 on the *Polar Queen*, with 88 participants; the use of wandering albatrosses for monitoring changes in sea surface temperature; and the inauguration of the new Chilean station "Profesor Julio Escudero", on King George I., on Feb. 5, 1995.

A-56313

Debenham, F., ed, **Voyage of Captain Bellingshausen to the Antarctic Seas, 1819-1821; translated from the Russian. Vol.I-II,** Millwood, N.Y., Kraus Reprint, 1986, 474p., Translation of: Dvukratnie izyskaniia v lUzhnom Ledovitom okeane. Reprint. Originally published: London: Printed for the Hakluyt Society, 1945. Originally published in series: Works issued by the Hakluyt Society; 2nd ser., No.91-92. Includes index.

DLC G161.H23

This is a translation of Captain T. Bellingshausen's account of his voyage to the antarctic ocean in 1819-1821. It consists of two volumes which include narratives with details of the voyage in excerpts from the Captain's journal, numerous maps of antarctic and subantarctic islands mentioned in the text, and 36 illustrations.

A-56319

McKenna, J.E., Jr., **Ecosystem management and fishery resources of the Antarctic,** *Ecosystem health,* June 1996, 2(2), p.110-126, 30 refs.

In an effort to wisely manage the exploitation of antarctic resources, an international commission was established in 1982 by the Convention for the Conservation of Antarctic Marine Living Resources. The Convention's objectives include maintaining ecological relationships and minimizing the risk of irreversible changes to the marine ecosystem. The Convention specifies that the Commission formulate, adopt, and revise conservation measures on the basis of the best scientific information available. Based on detailed assessments, the Commission has implemented controls over directed fishing efforts and has imposed strict conservation measures to halt the decline of most exploited stocks.

A-56341

Institut Français pour la Recherche et la Technologie Polaires, **Activity report for 1995 and the summer of 1995-1996** [Rapport d'activité: Année 1995 et campagnes d'été 95-96], Plouzané, France, IFRTP, 1996, 74p., In French. Refs. passim. For selected papers see B-56343, B-56344 and J-56342.

The 1995 activities of the French Institute for Polar Research and Technology (IFRTP) are reported, with outlines of 46 scientific programs and detailed reports of 5 projects, 3 of which cover oceanographic, ecological and biological investigations in antarctic and subantarctic regions. A bibliography of 1995 publications pertinent to the IFRTP programs reported is included.

B. BIOLOGICAL SCIENCES

B-54043

Wang, Z.P., **Factors influencing seasonal changes in the respiration of *Drepanopus bispinosus* (Copepoda: Calanoida) in Burton Lake, a marine derived saline lake in the Vestfold Hills, Antarctica,** *Antarctic record,* July 1995, 39(2), p.79-93, With Japanese summary. 24 refs.

Oxygen consumption of adult females of *Drepanopus bispinosus* living in a marine derived saline lake in East Antarctica was measured under different conditions of temperature, salinity, dissolved oxygen and food concentration in both winter and summer. Variations in respiration paralleled temperature changes, particularly when the animals were in temperatures higher than in the normal habitat (0±2°C) and below the upper thermal limit (13.1°C). The Q_{10} values for respiration lay between 1.65 to 1.89 from Aug. to Dec., but increased to 3.11 and 3.32 in Jan. Respiration also increased when the animals were subjected to salinities either higher or lower than normal habitat conditions (37.2-39.5 per mill). Oxygen consumption appeared to be related to the dissolved oxygen content and to some extent to the concentration of phytoplankton cells in the medium. (Auth. mod.)

B-54054

Rodhouse, P.G., White, M.G., **Cephalopods occupy the ecological niche of epipelagic fish in the Antarctic Polar Frontal Zone,** *Biological bulletin,* Oct./Nov. 1995, 189(2), p.77-80, 19 refs.

Recent data have revealed a large, previously overlooked trophic system in the southern ocean. The upper trophic levels of this open-ocean epipelagic community are exceptional in that they contain no fish species. Fishes are replaced by cephalopods, including the ommastrephid squid, *Martialia hyadesi.* This squid preys on mesopelagic myctophids (lanternfish), which feed largely on copepods. Identified here is a geographically distinct antarctic open-ocean food chain which is of importance to air breathing predator species but where antarctic krill is absent. This system is probably prevalent in areas of higher primary productivity, especially the Scotia Sea and near the peri-antarctic islands. Squid stocks in the APFZ may have potential for commerical exploitation, but they, and the predators they support, are likely to be sensitive to overfishing. Squid have a short, semelparous lifecycle, so overfishing in a single year can cause a stock to collapse. (Auth. mod.)

B-54055

McInnes, S.J., **Tardigrades from Signy Island, South Orkney Islands, with particular reference to freshwater species,** *Journal of natural history,* Nov./Dec. 1995, 29(6), p.1419-1445, 31 refs.

Seventeen species of Tardigrada from lakes and catchments on Signy I., South Orkney Is., are described. Two species, *Echiniscus punctus* and *Isohypsibius laevis* are new to science, and two, *Oreella minor* and *Pseudechiniscus suillus,* are new to the Signy Is. records. (Auth.)

B-54056

Starý, J., **Oribatid mites (Acari: Oribatida) of Beauchêne Island, Falklands, South Atlantic,** *Journal of natural history,* Nov./Dec. 1995, 29(6), p.1461-1467, 6 refs.

A total of 12 species of oribatid mites (Acari: Oribatida) are reported from Beauchêne I., including two new species. *Furcobates lewissmithi* n.sp. and *Oribatella blocki* n.sp. are described and figured. (Auth.)

B-54057

Starý, J., Block, W., **Oribatid mites (Acari: Oribatida) of South Georgia, South Atlantic,** *Journal of natural history,* Nov.-Dec. 1995, 29(6), p.1469-1481, 14 refs.

Twenty-one species of oribatid mites (Acari: Oribatida), including three new species, are reported from samples collected on the subantarctic island of South Georgia. *Fossonothrus wallworki* n.sp., *Lanceoppia elegantula* n.sp. and *Edwardzetes australis* n.sp. are described and figured. Ten additional species, recorded previously, provide a total of 31 species for the island. (Auth.)

B-54063

Villafañe, V.E., Helbling, E.W., Holm-Hansen, O., **Spatial and temporal variability of phytoplankton biomass and taxonomic composition around Elephant Island, Antarctica, during the summers of 1990-1993,** *Marine biology,* Oct. 1995, 123(4), p.677-686, 67 refs.

This paper describes the distribution of phytoplankton biomass and taxonomic composition in the vicinity of Elephant I. throughout the Antarctic Marine Living Resources study grid over a period of 4 yr (1990-1993), with emphasis on intra- and inter-annual variability in the phytoplankton assemblages. (Auth. mod.)

B-54064

Peck, L.S., Hayward, P.J., Spencer-Jones, M.E., **Pelagic bryozoan from Antarctica,** *Marine biology,* Oct. 1995, 123(4), p.757-762, 27 refs.

This paper describes an unattached colony form in a species of *Aleyonidium* from the Weddell Sea, an extraordinary, thin-walled, hollow sphere with an apparently pelagic habit, and considers its relationship to the benthic attached *A. flabelliforme.* (Auth. mod.)

B-54110

Monti, M., Fonda Umani, S., **Tintinnids in Terra Nova Bay, Ross Sea during two austral summers (1987/88 and 1989/90),** *Acta protozoologica,* 1995, 34(3), p.193-201, 36 refs.

Antarctic populations of tintinnids were studied during Italian expeditions to Terra Nova Bay. The authors identified 6 genera and 14 species of tintinnids. The community structure was very simple, constituted by the typical antarctic species. The genus *Cymatocylis* was abundant in the offshore stations, while the species *Codonellopsis gaussi* and *Laackmanniella naviculaefera* were abundant closer to the coast. The genus *Ptychocylis* was reported for the first time in this area. Most of the tintinnids found had hyaline loricae and showed a great morphological variability: *Cymatocylis drygalskii* ranged in length from 170 to 400 µm. The geographical distribution and the temporal pattern of tintinnids' abundance were related to those of chlorophyll *a*, which showed its highest values in the central eastern area of Terra Nova Bay. (Auth.)

B-54112

Gavagnin, M., Trivellone, E., Castelluccio, F., Cimino, G., Cattaneo-Vietti, R., **Glyceryl ester of a new halimane diterpenoic acid from the skin of the antarctic nudibranch *Austrodoris kerguelensis*,** *Tetrahedron letters,* Oct. 2, 1995, 36(40), p.7319-7322, 22 refs.

The monoglyceryl ester of a new halimane diterpenoic acid has been isolated as diacetyl derivative from the mantle tissue of the antarctic nudibranch *Austrodoris kerguelenensis.* The structure and the relative stereochemistry have been established by means of spectroscopic and chemical methods and by comparison with model compounds. An analysis of conflicting NMR data reported in the literature for molecules related to the diterpenoic part of monoglyceryl ester has also been made. (Auth.)

B-54113

Janes, D.N., Chappell, M.A., **Effect of ration size and body size on specific dynamic action in Adélie penguin chicks, *Pygoscelis adeliae*,** *Physiological zoology,* Nov.-Dec. 1995, 68(6), p.1029-1044, Refs. p.1041-1044.

Specific dynamic action (SDA), also termed the heat increment of feeding, is defined as the postprandial increase in oxygen consumption. The purpose of this study is to measure SDA in Adélie penguin chicks and to examine possible changes in SDA parameters during growth. Adélie penguin chicks of all sizes exhibited substantial SDA that increased with the size of the meal. The SDA coefficient was 10.0% of ingested energy and 14.8% of metabolizable energy. These values did not vary with body mass. Postprandial peak oxygen consumption rates did not vary with meal size. The time course of SDA increased with the ration level but did not vary with either body mass or meal size alone. The authors' estimate of the cost of growth in penguin chicks is intermediate between costs measured for other organisms. Specific dynamic action may serve a functional role in thermoregulation for Adélie penguins, which routinely experience temperatures below thermoneutrality. Cumulative SDA during growth is equal to about 62% of the energy deposited in new tissue. (Auth. mod.)

B-54114

Arnould, J.P.Y., Boyd, I.L., **Inter- and intra-annual variation in milk composition in antarctic fur seals *(Arctocephalus gazella)***, *Physiological zoology,* Nov.-Dec. 1995, 68(6), p.1164-1180, Refs. p.1179-1180.

The inter- and intra-annual variation in milk composition in antarctic fur seals was investigated over 3 consecutive lactation periods (1990-92) at Bird I., which included one period of low food availability. One hundred and ninety-two milk samples were collected from 154 individuals. Stage of lactation, maternal mass, and year of sampling accounted for 27% of the observed variability in gross energy content. Following the perinatal period, milk lipid and gross energy content increased throughout lactation in all years, whereas water content decreased. Protein content decreased throughout lactation in 1990 but increased in the following 2 yr. Milk lipid and protein content decreased by as much as 14 and 5%, respectively, during each 1-2 d lactation bout. Minor, though significant, variation was found between the composition of milk collected from different mammae within individuals. The changes in composition observed both within and between lactation periods, and the level of inter- and intra-individual variation, emphasize the need for extensive sampling in order to describe adequately milk composition in otariids. (Auth. mod.)

B-54122

Kattner, G., Hagen, W., **Polar herbiverous copepods—different pathways in lipid biosynthesis,** *ICES journal of marine science,* June/Aug. 1995, 52(3-4), p.329-335, 42 refs.

Herbivorous copepods, especially from polar regions, buffer the pronounced seasonality of primary production through the accumulation of large energy reserves that are deposited as neutral lipids, mainly wax esters but also triacylglycerols. Principal components of these lipids are the long-chain monounsaturated fatty acids and alcohols 20:1(n-9) and 22:1(n-11). Wax ester synthesis based on these compounds is most pronounced in the arctic copepod *Calanus hyperboreus,* but it is also characteristic of the other dominant herbivores, *Calanus glacialis* and *Calanus finmarchicus,* as well as for the antarctic *Calanoides acutus. Rhincalanus gigas,* another antarctic species, also fits this scheme of wax ester synthesizers, although its wax esters consist of shorter-chain fatty acids and alcohols. In contrast, the antarctic *Calanus propinquus* synthesizes triacylglycerols dominated by the two monounsaturated fatty acid isomers 22:1(n-11) and 22:1(n-9). This further elongation of the fatty acids increases their calorific value and may at least partially compensate this species' apparent inability to produce wax esters. Other dominant fatty acids in the lipids of these copepods originate from dietary input and may be used as trophic markers for herbivorous feeding. (Auth.)

B-54123

Atkinson, A., **Omnivory and feeding selectivity in five copepod species during spring in the Bellingshausen Sea, Antarctica,** *ICES journal of marine science,* June/Aug. 1995, 52(3-4), p.385-396, 59 refs.

The feeding habits of five dominant copepod species were compared by incubating them in natural sea water. Feeding rates on individual food taxa were calculated from optical cell counts. The larger species tended to eat larger cells and cleared cells up to 100-200 μm in length with increasing efficiency. Clearance rates on elongated cells were compared with those of shorter and fatter cells of similar volume. The longer cells were eaten at higher rates in 65% of comparisons, suggesting that cell elongation did not protect against ingestion by large copepods. The fact that the motile fraction comprised an array of taxa (nanoflagellates, dinoflagellates, and ciliates), all with a tendency to be cleared more rapidly than other diatoms, suggests that they were using mechanoreception to detect prey. Three were actively feeding under the ice before the bloom, in low productivity waters characterized by a nanoflagellate community and a high inorganic detritus content. The selection for motile taxa persisted into the bloom, even through motile cells comprised only a small fraction of available carbon at that time. The contribution of motile taxa to copepod diets depended on their contribution to the overall food source, the extent of motile/sessile selection, and also on their size and shape relative to the diatoms. (Auth. mod.)

B-54124

Huntley, M.E., Niiler, P.P., **Physical control of population dynamics in the southern ocean,** *ICES journal of marine science,* June/Aug. 1995, 52(3-4), p.457-468, 51 refs.

Horizontal advection is the single most important mechanism by which physics of the southern ocean exerts control on population dynamics of its resident zooplankton. Advection determines whether or not zooplankton will reside in food-poor areas or in food-rich areas. The shape and structure of advective features further determine the residence time of zooplankton in a given food regime. Advection thus bears directly on rates of growth, mortality, and reproduction. The intensity of advection on characteristic spatial scales in the southern ocean redistributes zooplankton to such a great degree that it utterly destroys the demographic integrity of populations. The spatial scale of advective features, determined by the internal Rossby radius, is much smaller in the southern ocean than at lower latitudes. At the same time, the life cycle of antarctic zooplankton is relatively long; copepods typically have a one-year life cycle, and that of krill is longer. A group of zooplankton that begins its life cycle as an identifiable population is subjected to the small-scale dispersive forces of advection for such a long time that by the time individual members reach maturity they will have been dispersed to such a great degree that they are no longer recognizable as a single population. It is concluded that the nature of physical control of zooplankton population dynamics in the southern ocean calls into question the very concept of a population. (Auth.)

B-54125

Schnack-Schiel, S.B., Hagen, W., **Life-cycle strategies of *Calanoides acutus, Calanus propinquus,* and *Metridia gerlachei* (Copepoda: Calanoida) in the eastern Weddell Sea, Antarctica,** *ICES journal of marine science,* Aug. 1995, 52(3-4), p.541-548, 37 refs.

The dominant antarctic copepods *Calanoides acutus, Calanus propinquus,* and *Metridia gerlachei* were studied in the eastern Weddell Sea during mid-winter (July/Aug. 1986), late winter/early spring (Oct./Nov. 1986), summer (Jan./Feb. 1985), and autumn (Apr./May 1992). The investigations focused on abundance, distribution, population dynamics, reproductive activity, and lipid contents. All three species had highest abundances in autumn. *C. acutus* exhibited the most pronounced seasonal vertical migrations, whereas *M. gerlachei* was more dispersed throughout the water column. In contrast, the majority of *C. propinquus* remained in the upper 200 m for most of the year; only in late winter/spring was it located mainly between 200 and 500 m. For a better understanding of the life history of these species their stage compositions, gonad maturities, and lipid contents were determined. These data revealed remarkable interspecific variations and suggest different life-cycle strategies for the three species. (Auth.)

B-54126

Fransz, H.G., Gonzalez, S.R., **Production of *Oithona similis* (Copepoda: Cyclopoida) in the southern ocean,** *ICES journal of marine science,* June/Aug. 1995, 52(3-4), p.549-555, 23 refs.

Seasonal variation in abundance and biomass of different instars of *Oithona similis* was studied for stations in the Weddell Sea and the Antarctic Circumpolar Current south of 60°S sampled in different years. Egg production was more spread over the seasons than in most calanoid copepod species and the mean stage was more constant, indicating a mixing of age classes and overlap of generations. Juvenile stages increase in abundance between Oct. and Jan., but the main development of copepodids was between Jan. and May. A minimum estimate of daily growth rate of 1.5% body weight corresponds with a development from Nauplius 1 to Copepodite 5 between Nov. 1 and May 30 and leads to an annual Production Biomass (P/B) ratio of 3.3. The mean population biomass in the southern waters was 150 mgC/m in the epipelagic zone and the minimum estimate of annual production 0.5 gC/m^2. Because the contribution of the species to zooplankton biomass in the southern ocean may be higher than elsewhere and the annual P/B is generally much higher than in the large calanoid species, the production of *O. similis* may be the highest of all zooplankton species in the antarctic region. (Auth.)

B-54131

Delille, D., **Seasonal changes of subantarctic benthic bacterial communities,** *Hydrobiologia,* Aug. 11, 1995, 310(1), p.47-57, 51 refs.

From Dec. 1982 to Feb. 1985 systematic observations of heterotrophic bacterial populations were recorded for a nearshore marine sediment of Kerguelen Archipelago. A weekly survey included physicochemical (temperature, mineral and organic C and N) measurements. Heterotrophic microbial activities were estimated by ^{14}C glucose and ^{14}C glutamic acid uptake measurements. The bacterial community structure was investigated by carrying out 57 morphological and biochemical tests on 1742 isolated strains. Qualitative data were analyzed by a numerical taxonomy technique using similarity coefficients with WPGM algorithm. The % abundance of the various taxonomic groups varied greatly with season. The existence of a succession of populations during bacterial growth resulting from periodic organic enrichment is clearly demonstrated. The nutrient supply rather than the temperature seems to be the major factor determining microbial fluctuations in the studied subantarctic coastal marine environments. (Auth. mod.)

B-54135

Machowski, J., **Changes in the antarctic environment under the impact of anthropopression and the legal means to counteract them,** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.11-16, With Polish summary.

Threats to the antarctic environment, and legislation aimed to protect it, are reviewed. Recommendations of the Antarctic Treaty Consultative Parties at various conventions over the years, and agreements such as the 1991 Protocol on Environmental Protection to the Antarctic Treaty, are examined in detail.

B-54136

Bielecka, L., **Cyclopoida of the Bransfield Strait (Antarctica, October-November 1986),** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.125-131, With Polish summary. 9 refs.

This paper is based on planktonic material collected between Oct.-Nov. 1986 in the Bransfield Strait. The predominant cyclopoid species were *Oithona similis* and *Oncaea curvata.* The genus *Oncaea* was concentrated in a deeper part of the studied water column than the genus *Oithona.* The distribution of Cyclopoida was influenced by hydrological conditions. (Auth.)

B-54137

Godlewska, M., **Natural and man induced variations in krill biomass (Western Antarctic, 1981-1989),** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.159-168, With Polish summary. 30 refs.

Hydroacoustic data collected on board the *Profesor Siedlecki* during 4 Polish expeditions to West Antarctica were analyzed to determine krill biomass variability. High krill concentrations were found in Bransfield Strait and around the South Orkney Is.; the lowest concentrations were recorded in the open waters of the Drake Passage. Figures and tables presented show significant krill biomass fluctuation both in space and time.

B-54138

Jażdżewski, K., Siciński, J., Presler, P., **Remarks on the bottom fauna of Admiralty Bay, South Shetlands, Antarctica,** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.169-176, With Polish summary. Refs. p.172-174.

Over 1000 qualitative and quantitative samples of bottom fauna, collected in Admiralty Bay during 3 wintering-over and 4 summer expeditions, were sorted out and studied. A list of papers describing some of the results is presented, and some additional data are summarized.

B-54139

Kompowski, A., **State of the blackfin icefish *(Chaenocephalus aceratus,* Lönnberg, 1906), (Pisces, Channichthyidae) stock off South Georgia (Antarctic) in 1988-1992,** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.199-202, With Polish summary.

The results of blackfin icefish stock monitoring made during the past four fishing seasons are presented. The samples were collected at random from catches made with a bottom trawl during the research cruises of R.V. *Profesor Siedlecki* (1988-89), M.T. *Hill Cove* (1989-90) and M.T. *Falkland Protector* (1990-91 and 1991-92). The total length of 9305 fishes was measured and the age of 1478 individuals was determined from otoliths. (Auth. mod.)

B-54140

Krzyszowska, A., **Human impact around polar stations on Fildes Peninsula (King George Island, Antarctica),** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.203-208, With Polish summary.

The tundra environment is very susceptible to disturbance and damage caused by human activity due to its low rate of production, slow decomposition, dry climatic conditions, and sparse vegetation. This environment is sensitive to chemical contamination, oil spills, and mechanical destruction. All these pollutants result from activities of human settlements (e.g. polar stations and tourist activities). The present study was designed to assess the effects of four polar stations on their immediate environment on Fildes Peninsula in Mar. 1991. The main visible sources of chemical contamination were identified as fuel spills from tanks, barrels, and pipes; fuel leaks from pumps and power stations; discharge of domestic sewage and dumping of solid waste.

B-54141

Rokicki, J., El Mehlaw, M.H., **Notes on the development of parasitic copepoda *Eubrachiella antarctica* (Quidor, 1906),** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.233-238, With Polish summary. 7 refs.

The parasitic copepod *Eubrachiella antarctica* was studied in different phases of its development. The copepods were collected on *Champsocephalus gunnari* and *Chionodraco rastrospinosus* at Joinville and Elephant islands and on South Georgia in 1983 and 1986-1988. (Auth. mod.)

B-54142

Rokicki, J., Strömberg, J.O., El Mehlaw, M.H., **Occurrence of *Eubrachiella antarctica* (Quidor, 1906) on the antarctic fish *Champsocephalus gunnari* (Lönnberg, 1905),** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.239-248, With Polish summary. 5 refs.

Infestation of the antarctic fish *Champsocephalus gunnari* by parasitic copepod *Eubrachiella antarctica* was studied. The parasitic occurrence on various parts of the host's body is analyzed. An attempt is made to relate the degree of infestation of *C. gunnari* to body length, age of the infested fish and season of capture. (Auth.)

B-54143

Zmijewska, M.I., **Seasonal changes in the vertical distribution and stage structure of the population of *Metridia gerlachei* in Croker Passage, Antarctic Peninsula,** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.273-284, With Polish summary. 8 refs.

The life history of the most abundant antarctic copepod *Metridia gerlachei* was determined from analyses of sets of vertically-stratified zooplankton samples (500 μm and 200 μm mesh adjacent nets) taken day and night during 3 austral seasons at 1200 m depth in the Croker Passage off the Antarctic Peninsula. *M. gerlachei* shows diurnal vertical migration, but no seasonal migration was noted. In winter *M. gerlachei* stays close to the surface zone, which is occupied by herbivorous copepods during summer. Multiple generations of *M. gerlachei* were studied. (Auth. mod.)

B-54155

Nishiguchi, M.K., Duval, B., Moser, D.P., **Analysis of dimethylsulfoniopropionate from *Phaeocystis pouchetii* in the waters of McMurdo Sound, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.102-105, 27 refs.

Phaeocystis pouchetii is a marine microalga that forms globular, gelatinous colonies up to several millimeters in diameter. *Phaeocystis* also produces dimethyl sulfide (DMS), a sulfur-based compound that is released into the atmosphere and is transformed into sulfate aerosols. The authors report low *Phaeocystis* numbers in the water off McMurdo Station and vicinity for Jan. 1994. Few *Phaeocystis* blooms were observed in other parts of the Ross Sea. Because this organism is a major component of the antarctic marine ecosystem, its population cycles (i.e., blooms and population declines) may affect the marine life around McMurdo Sound and could have major control of the amount of sulfate aerosols being produced from antarctic coastal waters.

B-54161

Ainley, D., **Autumn distribution of marine birds and mammals in the Amundsen and Bellingshausen Seas,** *Antarctic journal of the United States,* 1994, 29(5), p.118-119, 8 refs.

The collection of data on seabird abundance during 11 shelf-break crossings between the Ross Sea and the base of the Antarctic Peninsula is reported. The census covered birds, seals and whales on 450 sequential 6-10 km long census segments, gathering data on about 4,000 seabird-, 75 whale-, and 235 seal-sightings. Increased abundances of all specimens were observed over the slope and shelf break, as observed previously in the Ross Sea, but there was a virtual lack of birds over the continental shelf. This is opposite to the pattern seen over continental shelves at lower latitudes. The author concludes that seabirds observed over the shelf, especially when cross-shelf traffic is at its peak during late summer, are not likely interacting in a major way with water column/food web processes but are merely in transit.

B-54162

Gelatt, T., Hill, S., Scotten, B., **Research to investigate pack-ice seal activities during *Nathaniel B. Palmer* cruise 94-2,** *Antarctic journal of the United States,* 1994, 29(5), p.120-121, 5 refs.

This report considers the data obtained on pack-ice seals during the *Nathaniel B. Palmer* 94-2 cruise, incidental to the conductivity-temperature-depth station course track between Feb. 16 and Apr. 1, 1994. The primary objective was to census all pack-ice seals within view of the ship while under way during daylight hours. The second major focus was to collect blood and tissue samples from as wide a distribution of crabeater and Weddell seals as possible.

B-54171

Massalski, A., Mrozińska, T., Olech, M., ***Lobococcus irregularis* (Boye-Pet.) Reisigl var. *antarcticus* var. nov. (Chlorellales, Chlorophyta) from King George Island, South Shetland Islands, Antarctica, and its ultrastructure,** *Nova Hedwigia,* Aug. 1995, 61(1-2), p.199-206, 10 refs.

A new variety of *Lobococcus irregularis* (Boye-Pet.) Reisigl is described. The alga was collected during the XIII Polish Antarctic Expedition; it was found on the volcanic rocky substratum on King George I. Detailed studies include the complete life cycle and the ultrastructure. (Auth.)

B-54173

Gremmen, N.J.M., Huiskes, A.H.L., Francke, J.W., **Standing crop of the coastal macrolichen *Mastodia tesselata,* and its relationship to nutrient concentrations, on Petermann Island, Antarctica,** *Lichenologist,* 1995, 27(5), p.387-394, Refs. p.393-394.

The standing crop of the epilithic foliose lichen *Mastodia tesselata* and some other species, the nutrient status (chloride, phosphate, nitrate and ammonium) of the substratum, slope and moisture availability were studied in 29 sample plots on Petermann I. The observed standing crop values for *Mastodia* ranged from 49 to 614 g/m^2, with an average of 310 g/m^2, and were 542 g/m^2 for *Rinodina petermannii* and 314 g/m^2 for the alga *Prasiola crispa* in two meltwater pools. A regression equation with log-transformed ammonium and phosphate concentrations as predictors explained 75% of the observed variance in *Mastodia* standing crop. No significant influence of chloride or nitrate concentration on the *Mastodia* standing crop was detected, indicating that *Mastodia* is a salt-tolerant lichen species, but is not an obligate halophyte. The maximal standing crop of *Mastodia* on Petermann I. proved to be lower than maximal values found for fruticose macrolichen vegetation in the maritime and continental Antarctic. (Auth. mod.)

B-54174

Branch, M.L., **Polychaeta of subantarctic Marion and Prince Edward Islands: illustrated keys to the species and results of the 1982-1989 University of Cape Town surveys,** *South African journal of antarctic research,* 1994, 24(1&2), p.3-52, Refs. p.50-52.

The Polychaeta of Marion and Prince Edward Is. (MPE) were sampled over the period 1982-1989 by dredging, scuba-diving and intertidal surveys. This paper includes illustrated keys to all the 90 species of Polychaeta collected during these and previous surveys, including 27 new records. Summaries are provided of the depth distributions, abundances and habitats, as well as the geographical distributions of the species. Polychaeta are one of the main groups of macrobenthic animals occurring at Marion I. and make up of 32% of the total number of animals in the scuba surveys. Four species dominated the dredge collections: *Lanice marionensis, Serpula vermicularis vermicularis* and *Eunice pennata* in soft sediment communities between 50 and 350 m depths and *Thelepus extensus* at 15 to 50 m in the kelp understory. Two of these common species, *L. marionensis* and *T. extensus,* have been renamed, having been previously recorded as *Lanice flabellum* and *Thelepus setosus* respectively. The Polychaeta of MPE show the closest affinity with Kerguelen I. but also include 24 cosmopolitan species, 26 shared with the Antarctic and 14 shared with the southern continents. (Auth.)

B-54175

Gon, O., Hendry, D.A., Mostert, D., **Glycoprotein antifreeze in *Notothenia coriiceps* (Pisces: Nototheniidae) from the sub-Antarctic Marion Island,** *South African journal of antarctic research,* 1994, 24(1&2), p.53-56, With Afrikaans summary. 17 refs.

Research on *Notothenia coriiceps* from Marion I. suggests that its blood contains antifreeze glycoprotein (AFGPs) and its kidneys are aglomerular. This is the first time both features of freezing avoidance have been found in fish distributed north of the Antarctic Polar Front. The results of this study favor the argument that antarctic and subantarctic stocks of *N. coriiceps* represent a single species. (Auth.)

B-54176

Steele, W.K., Balfour, D.A., Harris, J.M., Dastych, H., Heyns, J., Eicker, A., **Preliminary biological survey of Vesleskarvet, northern Ahlmannryggen, western Queen Maud Land: site of South Africa's new Antarctic base,** *South African journal of antarctic research,* 1994, 24(1&2), p.57-65, Refs. p.64-65.

The results of a preliminary biological survey of Vesleskarvet, a nunatak in the northern Ahlmann Ridge, are presented. Vesleskarvet is the site of the new SANAE IV base; the biological survey preceded base construction. Soil nutrient levels are low and plant growth is very sparse, with only 9 species of lichen and one unidentified species of moss being recorded to date. Bacteria, microalgae, fungi, rotifers and ciliates were counted from soil samples. No collembolans and only one specimen of mite, suspected to be *Tydeus* sp., were found. However, 3 species of Tardigrada, including two previously undescribed and 3 nematode species, one of which represents a new genus, were recorded at the site. Four species of birds were seen in the vicinity of Vesleskarvet but none breeds at the nunatak and only one, the snow petrel *Pagodroma nivea,* is commonly seen. (Auth. mod.)

B-54177

Hiller, N., **Biogeographic relationships of the brachiopod fauna from Marion and Prince Edward Islands,** *South African journal of antarctic research,* 1994, 24(1&2), p.67-74, 14 refs.

The small brachiopod fauna from Marion and Prince Edward Is. comprises at least six species belonging to five genera. Biogeographically, this fauna shows closest affinity with that from the other islands in the southern Indian Ocean, but a surprising connection to the southern African region is evident. The components of the fauna are thought to have migrated into the region during the Late Pleistocene by way of major ocean current systems. (Auth)_

B-54178

Jonker, F.C., Bester, M.N., **Diving behaviour of adult southern elephant seal, *Mirounga leonina,* cows from Marion Island,** *South African journal of antarctic research,* 1994, 24(1&2), p.75-93, With Afrikaans summary. Refs. p.92-93.

The diving patterns of 8 adult southern elephant seal cows (seven post-breeding and one post-moulting) from Marion I. were recorded during the pelagic phase of their annual cycle, using geolocating time-depth recorders attached to the seals. A total of 28,948 dives have been categorized into 7 distinct types representing transit, exploratory and foraging dives. No benthic foraging dives were recorded and all but one cow showed a marked diel variation in dive depth, dives being deeper during the day (by 30 to 300 m) than during the night. Mean (±SE) dive depth ranged from 406±157 m to 585±226 m and mean dive duration from 19.08±5.77 min to 33.41±14.62 min, the deepest and longest dives being 1,444 m and 113 min, respectively. Dive depth and duration were positively correlated and unimodal in their frequency distribution. It is postulated that the seasonal and individual variation in the diving behavior of southern elephant seal cows are related to their geographic locations and the abundance and behavior of their prey. (Auth. mod.)

B-54181

Newton, I.P., Cooper, J., Mehlum, F., Thor, G., **Bibliography of terrestrial biological research in Dronning Maud Land, Antarctica,** *South African journal of antarctic research,* 1994, 24(1&2), p.111-124, 4 refs.

A bibliography is provided covering terrestrial (including freshwater) biological research carried out in Queen Maud Land. Research on seabirds at sea and marine biology (e.g. fishes, sea algae) off Queen Maud Land is not covered, but results of land- and shelf-ice based avian studies in other habitats within the sector are. A total of 388 published or in-press titles of scientific articles covering the period 1954 to 1994 is included. A few relevant historical and expeditionary accounts are included for completeness.

B-54182

Cooper, J., Van Wyk, J.C.P., Matthewson, D.C., **Effects of small-mammal trapping on birds at sub-Antarctic Marion Island,** *South African journal of antarctic research,* 1994, 24(1&2), p.125, 4 refs.

Trapping methods used to study, control or eradicate introduced mammals at oceanic islands can have deleterious effects on the naturally occurring avian fauna, unless procedures are adopted to reduce incidental mortality. Use of Sherman live traps, however, results in insignificant mortality of birds at Marion I.; the note reports that out of a total of 46,500 trap-nights only four birds were found caught in Sherman traps: three subantarctic skuas and one lesser sheathbill.

B-54183

Cooper, J., Avenant, N.L., Van Wyk, J.C.P., **Observations of the shortsnout lancetfish *Alepisaurus brevirostris* at sub-antarctic Marion Island,** *South African journal of antarctic research,* 1994, 24(1&2), p.126, 4 refs.

The head of a predatory fish was found at Trypot Beach, Marion I., on Jan. 5, 1993. Based on descriptions and illustrations given in Gon & Klages (1988) and Gon & Heemstra (1990), the head was identified as that of a shortsnout lancetfish. Head length (tip of snout to rear of operculum) was 132 mm, matching the 132.3 mm given for the first record (Gon & Klages 1988). The head was fresh and showed no signs of decomposition.

B-54185

Gooday, A.J., Bernhard, J.M., Bowser, S.S., **Taxonomy and ecology of *Crithionina delacai* sp. nov., an abundant large agglutinated foraminifer from Explorers Cove, Antarctica,** *Journal of foraminiferal research,* Oct. 1995, 25(4), p.290-298, Refs. p.297-298.

Crithionina delacai, a new large (up to 6.5 mm) agglutinated foraminifer that differs from related species (notably *C. granum)* in the composition and arrangement of particles within the test, is described. The new species is abundant at a 28-m deep site in Explorers Cove. This unusually shallow-water occurrence for a species of *Crithionina* reflects the tranquil, cold (-1.8°C), thermally stable and relatively oligotrophic conditions that prevail at the study site. *C. delacai* lives infaunally in the top 1 cm of sediment and apparently feeds on diatoms. Its abundance at depths accessible to scuba divers provides a unique opportunity to conduct detailed biological studies of this predominantly deep-sea genus. (Auth.)

B-54186

Bevan, R.M., Butler, P.J., Woakes, A.J., Prince, P.A., **Energy expenditure of free-ranging black-browed albatrosses,** *Royal Society of London. Philosophical transactions. Series B,* Nov. 29, 1995, 350(1332), p.119-131, Refs. p.130-131.

As heart rate (f_H) can be used to determine the energy expenditure of black-browed albatrosses *(Diomedea melanophrys),* data loggers for recording f_H and abdominal temperature (T_{ab}) were implanted into free-ranging black-browed albatrosses breeding at South Georgia. Five birds also had salt water switches (sws) attached to one leg to record when the birds were on the water, and two others had satellite transmitters attached to their back to determine the birds' position at sea. The birds were released into their natural environment and recaptured, on average, 23 days later when the data loggers were removed. The f_H data were then converted into estimates of energy expenditure (EE) using a previously derived equation. This is the first study to have used f_H extensively to determine the EE of a free-ranging marine bird. The advantage of using this technique is that data can be obtained over long durations with high resolution, permitting the EE of different activities to be estimated. (Auth. mod.)

B-54187

Londraville, R.L., Sidell, B.D., **Purification and characterization of fatty acid-binding protein from aerobic muscle of the antarctic icefish *Chaenocephalus aceratus*,** *Journal of experimental zoology,* Oct. 15, 1995, 273(3), p.190-203, Refs. p.202-203.

Intracellular fatty acid-binding protein was purified and characterized from aerobic skeletal muscle of the antarctic icefish *Chaenocephalus aceratus.* Molecular mass of *C. aceratus* FABP (CA-FABP) is 14,936 Da as estimated by electrospray mass spectrometry. CA-FABP is expressed at an intracellular concentration of 0.984±0.115 mg CA-FABP/g wet weight aerobic muscle and binds 0.859±0.013 moles oleic acid per mole of protein at a physiological temperature of 0°C. Dissociation constants (K_ds) for various fatty acid ligands range from 1.38 to 2.71 μM; K_ds are not significantly different among palmitic acid (16:0), palmitoleic acid (16:1), and oleic acid (18:1). Competition assays reveal that CA-FABP does not have preferential affinity for the very-long-chain polyunsaturated fatty acids that are common in antarctic fish (e.g., docosahexaenoic acid; 22:6). Partial amino acid sequence from CA-FABP aligns with mammalian heart-type FABPs with as high as 74% identity. These data are strikingly similar to mammalian values, yet they are derived from an organism that is distant from mammals in terms of phylogeny, body temperature, and physiology. (Auth.)

B-54189

Rohde, K., Hayward, C., Heap, M., **Aspects of the ecology of metazoan ectoparasites of marine fishes,** *International journal of parasitology,* Aug. 1995, 25(8), p.945-970, Refs. p.969-970.

Numerous (3947) individuals of 102 marine fish species from Papua New Guinea, New Zealand, the North Sea, Antarctica, the deep-sea and coast of southeastern Australia, Pacific Canada, Brazil, Argentina and the Great Barrier Reef were examined for metazoan ectoparasites. Of the 102 fish species, 86 harbored at least 1 parasite species, and only in Antarctica and the deep-sea were large proportions of fish species found to be free of ectoparasites. Community abundance varies greatly at and between localities, with the lowest found in antarctic and deep-sea fish and the highest in tropical fish. (Auth. mod.)

B-54191

Graczyk, T.K., et al, **Detection of avian malaria infections in wild and captive penguins,** *Helminthological Society of Washington. Journal,* July 1995, 62(2), p.135-141, Refs. p.140-141.

Sera from wild African black-footed penguins *(Spheniscus demersus* L., 1758), Adélie penguins *(Pygoscelis adeliae* Houbron, 1841), Gentoo penguins *(Pygoscelis papua* Forster, 1781), king penguins *(Aptenodytes patagonicus* Miller, 1778), and little blue penguins *(Eudyptula minor* Forster, 1781), and from captive yellow-eyed penguins *(Megadyptes antipodes* Houbron, 1841) and Magellanic penguins *(Spheniscus magellanicus* Forster, 1781) were tested by enzyme-linked immunosorbent assays for the presence of avian malaria antibodies (Ab). It was possible to detect penguin immunoglobulins at a dilution of $10^{-4.11}$. The relative binding of anti-*S. demersus* IgG was equal to relative binding of commercial conjugates. Kinetic profiles and overall magnitudes of malarial Ab detected by the 2 antigens were not significantly different. Antarctic *P. adeliae* were negative for malarial Ab, all New Zealand *M. antipodes* were positive, and the positivity prevalence of the remaining penguins ranged from 33 to 92%. (Auth. mod.)

B-54192

Lenihan, H.S., Kiest, K.A., Conlan, K.E., Slattery, P.N., Konar, B.H., Oliver, J.S., **Patterns of survival and behavior in antarctic benthic invertebrates exposed to contaminated sediments: field and laboratory bioassay experiments,** *Journal of experimental marine biology and ecology,* Nov. 13, 1995, 192(2), p.233-255, Refs. p.254-255.

Benthic invertebrates were exposed to chemically contaminated sediments (primarily petroleum hydrocarbons) from a well-defined pollution gradient around McMurdo Station in a series of field and laboratory bioassay experiments. The patterns of survival and behavior in these experiments corresponded to patterns observed in standard U.S. EPA laboratory bioassays. The contaminated end of the pollution gradient is Winter Quarters Bay where total hydrocarbons are as high as 4500 µg/g sediment. Mortality of *Heterophoxus videns* K.H. Barnard, a phoxocephalid amphipod crustacean, in standard laboratory bioassays was highest in sediment from Winter Quarters Bay, high in sewage outfall sediments, and generally decreased in sediments with increasing distance from the bay. Similar survival patterns were documented for several other crustacean species. The authors exposed *H. videns* and *Eudorella splendida* Zimmer, a cumacean, to Winter Quarters Bay and uncontaminated sediments for 10 and 28 days in field bioassays. Greater mortality was evident in Winter Quarters Bay sediment but the difference between treatments was not significant. (Auth. mod.)

B-54193

Goldspink, G., **Adaptation of fish to different environmental temperature by qualitative and quantitative changes in gene expression,** *Journal of thermal biology,* Feb.-May 1995, 20(1/2), p.167-174, Refs. p.173-174.

In antarctic fish the myofibrillar ATPase activity is relatively high at temperatures around 0°C, but this is at the expense of enzyme thermostability as this enzyme from antarctic fishes is heat inactivated at comparatively low temperatures. Such thermal characteristics may be a general feature of proteins from antarctic fish and so may contribute to their extreme cold stenothermy. Some eurythermal species of fish have the ability to rebuild their contractile systems by expressing a different set of genes at low temperature to that expressed at warm environmental temperatures. The authors have cloned and are in the process of characterizing warm and cold as well as embryonic myosin heavy chain isoform genes of carp. These genes encode different types of myosin crossbridges (the force generators for muscular contraction) and therefore determine the contractile characteristics of the muscle. The physiological result of the switches in gene expression are that the muscles of fish acclimated to low environmental temperatures develop more force and more power at these temperatures than muscles from fish acclimated to warm environmental temperatures. (Auth. mod.)

B-54195

Moyano G., H.I., **Cellariiform and flustriform microporellid Bryozoa from Antarctica** [Briozoos microporélidos celariformes y flustriformes de la Antártica], *Sociedad de Biología de Concepción. Boletín,* 1989, Vol.60, p.161-172, In Spanish with English summary. 24 refs.

DLC QH301.S57

A description of the new species *Adelascopora jeqolqa* sp. n. and the redescription of *Adelascopora secunda* Hayward & Thorpe are provided from material collected in the South Shetland Is. and along the Antarctic Peninsula. *A. jeqolqa* is introduced for the antarctic cellariiform microporellid bryozoan samples which Waters (1904) and subsequent authors, including Hayward & Thorpe (1988) considered conspecific with the Patagonian fossil *Microporella divaricata* Canu 1904. The redescription of *A. secunda* is based on fully developed and mature specimens. The description of *A. jeqolqa* sp. n. causes the Middle Tertiary Patagonian fossil *M. divaricata* Canu, 1904, to be the type-species of the genus *Adelascopora* Hayward and Thorpe, 1988. (Auth.)

B-54196

Rosso, A., **Infralittoral Bryozoa associated to macroalgae from the First Italian Antarctic Oceanographic Expedition (Terra Nova Bay, Ross Sea),** *Sociedad de Biología de Concepción. Boletín,* 1991, Vol.62, p.179-186, With Spanish and Italian summaries. 21 refs.

DLC QH301.S57

Samples for the study of phytobenthos collected by skin-divers in Terra Nova Bay during the First Italian Oceanographic Antarctic Expedition have shown an abundant bryozoan fauna. Nearly all the analyzed colonies live on the macrophytae. A total of 19 species have been determined with a dominance of Cheilostomida and a Cheilostomida/Cyclostomida ratio of 2.8. Among the 6 zoarial forms which have been found, the membraniporiform is dominant. Specific diversity, calculated by means of the Shannon-Wiener Index, fluctuated between 0.69 and 2.28. The growth stages of the observed species and their settlement and colonization strategies are discussed. (Auth.)

B-54197

Vanhove, S., et al, **Deep-sea meiofauna communities in Antarctica: structural analysis and relation with the environment,** *Marine ecology progress series,* Nov. 2, 1995, 127(1-3), p.65-76, Refs. p.74-76.

Metazoan meiofauna in the Weddell Sea was collected from depths between 211 and 2080 m. Total meiofaunal abundance ranged from 815 to 5122 ind. per 10 cm^2 and total biomass from 126 to 966 µg dwt per 10 cm^2. Nematodes dominated the samples (range 83 to 97%), followed by harpacticoid copepods, polychaetes and kinorhynchs. A typical skewed length-frequency distribution was obtained with most nematodes in the 0.4 to 0.6 mm size class. The meiofauna communities were primarily influenced by bathymetric depth and food availability, which in turn are suggested to be directly related to phytoplankton blooms and associated sedimentation pulses. Standing stock and distribution patterns indicate that the meiofauna from the Weddell Sea show similar features to major deep-sea assemblages elsewhere in the world. (Auth.)

B-54198

Arrigo, K.R., Dieckmann, G.S., Gosselin, M., Robinson, D.H., Fritsen, C.H., Sullivan, C.W., **High resolution study of the platelet ice ecosystem in McMurdo Sound, Antarctica: biomass, nutrient, and production profiles within a dense microalgal bloom,** *Marine ecology progress series,* Nov. 2, 1995, 127(1-3), p.255-268, Refs. p.267-268.

Vertical distributions of inorganic nutrients (nitrate, nitrite, ammonium, phosphate, and silicic acid) and microalgal and bacterial biomass were monitored within both the lower congelation ice and the platelet ice layer in McMurdo Sound from Oct. 31 to Dec. 3, 1989. Profiles of dissolved organic matter (DOM) (amino acids and simple sugars) and heterotrophic protists were also obtained in early Dec. Microalgal standing crop increased from 9.4 to 37.4 g C/m^2 during the 34 d study and maximum pigment concentrations exceeded 6500 mg chl a/m^3 near the congelation ice/platelet ice interface. Estimates of seawater exchange within the platelet ice ranged from 0.06 to 0.61 m^2/d when $Si(OH)_4$ was used as a tracer. The biochemical composition of the autotrophic community and the presence of high nutrient concentrations within the platelet layer indicated that the growth of platelet ice algae was limited by light, rather than nutrients, throughout the season. NO_3 and $Si(OH)_4$ concentrations in the platelet ice were generally high, but became depleted in the uppermost layers as chl *a* peaked late in Nov. NH_4 was far more abundant in the platelet ice than in the underlying water column throughout the field season. Microbial regeneration was primarily responsible for the high background concentrations of NH_4 in the platelet ice. (Auth. mod.)

B-54199

Helbling, E.W., Marguet, E.R., Villafañe, V.E., Holm-Hansen, O., **Bacterioplankton viability in antarctic waters as affected by solar ultraviolet radiation,** *Marine ecology progress series,* Oct. 5, 1995, 126(1-3), p.293-298, 20 refs.

The effect of solar ultraviolet radiation (UVR) on viability of natural bacterioplankton assemblages from antarctic waters, as well as on 2 cultures of isolated bacterial strains *(Acinetobacter* sp. and *Bacillus* sp.), was determined by both *in situ* and temperature-controlled incubator experiments. When natural assemblages were incubated *in situ* at 0.5 m depth, the mean percentage survival fractions (of the bacteria forming colonies on agar) were 13% when the sample was exposed to all UVR, 27% when UV-B radiation was eliminated with a prefilter, and 85% when all UVR was excluded. The magnitude of UVR-induced inhibition decreased with depth so that there was no significant inhibition at 9.5 m. There was very little effect of photosynthetically available radiation (PAR), even at 0.5 m depth. The loss of viability due to UVR or PAR was much greater for the 2 isolated strains than for the natural bacterial assemblages. (Auth. mod.)

B-54201

Arnould, J.P.Y., **Indices of body condition and body composition in female antarctic fur seals *(Arctocephalus gazella)*,** *Marine mammal science,* July 1995, 11(3), p.301-313, Refs. p.311-313.

An attempt was made to develop simple, inexpensive, rapid means of determining body composition in antarctic fur seals *(Arctocephalus gazella).* Measurements of total body water (TBW) and total body lipid (TBL), obtained by hydrogen isotope dilution, were compared to the results of bioelectrical impedance analysis (BIA) and morphometric indices of body condition in 52 adult females. TBW was weakly correlated with BIA measurements of resistance ($r = -0.30, P < 0.03$). Conductor volume ($length^2/resistance$) was more highly correlated with TBW ($r = 0.75, P < 0.0001$) and the inclusion of mass into the predictive equation improved the correlation further ($r = 0.95, P < 0.0001$). A body condition index (mass/length) previously used in pinniped studies was positively correlated to TBL ($r = 0.77, P < 0.0001$), validating its use as a relative index of condition. However, body mass alone was highly correlated to TBW ($r = 0.94, P < 0.0001$) and appears to provide a simple, rapid means of estimating body composition in adult females. This technique may also be applicable to juvenile male antarctic fur seals. (Auth.)

B-54202

Bester, M.N., **Reproduction in the female subantarctic fur seal, *Arctocephalus tropicalis*,** *Marine mammal science,* July 1995, 11(3), p.362-375, Refs. p.373-375.

The reproductive tracts of 89 female subantarctic fur seals, taken at Gough I. between Nov. 1977 and Oct. 1978, were examined. Females started ovulating at age 4 yr and all 6-yr old females were sexually mature. They are mono-ovulatory, alternating between ovaries, and only single embryos were found. Females older than 13 yr (n=11) showed poor follicular development and some failed to ovulate. The gestation period (first recorded ovulation to first recorded birth) was 360 d, while delayed implantation (first recorded ovulation to first recorded implantation) lasted for 139 days. Follicle numbers in the functional ovary declined sharply after ovulation while the corpus luteum increased in size until at least 1 mo. prior to parturition. The number of follicles in the contralateral ovary increased after midwinter (June/July), and the mean size of the largest follicles peaked prior to ovulation in Dec. The mean size of the largest follicles increased in both ovaries near implantation time, after reaching a low subsequent to ovulation. The regressing corpus albicans, conspicuous for approximately 3 mo. after parturition, could not be detected macroscopically within one year postpartum. (Auth. mod.)

B-54231

Meurk, C.D., Foggo, M.N., Wilson, B., **Vegetation of subantarctic Campbell Island,** *New Zealand journal of ecology,* 1994, 18(2), p.123-168, 64 refs.

DLC QH540.N43 1994

The vegetation of Campbell I. and its offshore islets was sampled quantitatively at 140 sites. One hundred twenty-four vascular species were recorded; 85 non-vascular cryptogams or species aggregates play a major role in the vegetation. Up to 19 factors of the physical environment were recorded or derived for each site. Agglomerative cluster analysis of the vegetation data was used to identify 21 plant communities. These (together with cryptogam associations) include: maritime crusts, turfs, megaherbfields, tussock grasslands, and shrublands; mid-elevation swamps, flushes, bogs, tussock grasslands, shrublands, dwarf forests, and induced meadows; and upland tundra-like tussock grasslands, tall and short turf-herbfields, bogs, flushes, rock-ledge herbfields, and fellfields. Heat harvesting in the cool, cloudy, wet, and windy climate may also be implicated. The history of farming and natural disturbances has resulted in a complex mosaic of vegetation-soil systems of varying maturity. Their putative dynamic interrelationships are depicted in terms of impacts of burning, grazing, marine animals and climate change and subsequent recovery or primary and secondary succession. (Auth. mod.)

B-54238

Klöser, H., Arntz, W.E., **Research on Antarctic Shallow Coastal and Littoral Systems (RASCALS)** [Untersuchungen zur Struktur und Dynamik eines antarktischen Küstenökosystems], *Polarforschung,* 1995(Pub. 1994), 64(1), p.27-41, In German with English summary. 154 refs.

Due to its long and independent development under comparatively constant environmental conditions, the ecosystem of the southern ocean may be extremely sensitive to disturbance, particularly in the coastal areas. Therefore, within the concerns of expected global climate changes, scientific interest in the coastal antarctic ecosystem has increased considerably. However, up to now there has not been a complex ecosystem approach which integrates individual results into a comprehensive framework. Since 1991, this method has been realized by the German-Argentinian program "RASCALS" on King George I. The aim of the program is to elucidate structures and dynamics of the coastal communities. A limited area is analyzed in great detail, covering as many aspects as possible. Results are fed into a model, which will allow many predictions about the consequences of global climate change for the antarctic coasts. (Auth. mod.)

B-54241

Schofield, O., Kroon, B.M.A., Prézelin, B.B., **Impact of ultraviolet-B radiation on photosystem II activity and its relationship to the inhibition of carbon fixation rates for antarctic ice algae communities,** *Journal of phycology,* Oct. 1995, 31(5), p.703-715, Refs. p.714-715.

One goal of the Icecolors 1993 study was to determine whether or not photosystem II (PSII) was a major target site for photoinhibition by ultraviolet-B radiation (Q_{UVB}, 280-320 nm) in natural communities. Second, the degree to which Q_{UVB} inhibition of PSII could account for Q_{UVB} effects on whole cell rates of carbon fixation in phytoplankton was assessed. On Oct. 1, 1993, at Palmer Station, dense samples of a frazil ice algal community were collected and maintained outdoors in the presence or absence of Q_{UVB} and/or ultraviolet-A (Q_{UVA}, 320-400 nm) radiation. Samples were then collected at intervals over the day to track the time course of UV inhibition of primary production. The ice algae were assessed for changes in pigment composition and rates of carbon fixation. Fluorescence overestimated the observed Q_{UVB} inhibition in measured carbon fixation rates by 8% in the morning hours; the discrepancy increased during the afternoon. Therefore, researchers should be cautious in using fluorescence measurements to infer ultraviolet inhibition for rates of carbon fixation until there is a greater understanding of the coupling of carbon metabolism to PSII activity for natural populations. (Auth. mod.)

B-54252

Petz, W., Song, W., Wilbert, N., **Taxonomy and ecology of the ciliate fauna (Protozoa, Ciliophora) in the endopagial and pelagial of the Weddell Sea, Antarctica,** *Stapfia,* Aug. 23, 1995, No.40, 223p., Refs. p.200-218.

The ciliate colonization and community of antarctic sea ice were studied in the austral autumn using a direct live counting method. Grease and very young pancake ice contained no, or very few, ciliates (up to 200 active ind/l of melted ice); distinctly more (5,347 active ind/l on average) were found in up to 50 day old pancake ice; still higher abundances occurred in multiyear sea ice (max. 57,000 ind/l melted ice, 370 µg carbon/l). Population densities decreased towards the top of the ice. Very low numbers (333 active ind/l) were found in the pelagial. The plankton community differed markedly from that of sea ice: *Gymnozoum* spp. and *Strombidium* spp. dominate in the ice, tintinnids, mainly *Codonellopsis glacialis* and *Cymatocylis convallaria,* in the plankton. Species found within sea ice were usually not recorded in the pelagial and vice versa. Forty-six ciliate species, predominantly from sea ice, and 6 from the pelagial were investigated morphologically and ecologically. Descriptions are based on live observations, protargol and silver nitrate impregnations, morphometrical analyses and scanning electron microscopy. Seventeen new species are established. (Auth. mod.)

B-54256

Cavieres, F., Fernández, E., Rubio, C., Quilhot, W., **Lichens used in studies of chemical ecological problems** [Importancia de las colecciones de líquenes en el estudio de problemas químico-ambientales], *Boletín Antártico Chileno,* Nov. 1995, 14(2), p.2-4, In Spanish with English summary. 19 refs.

Lichens have developed chemical strategies to minimize damage induced by UV radiation. Antarctic lichens accumulate phenolic compounds that act as chromophores of UV-A and UV-B radiation, having chemical and photochemical stability. Because of these properties, herbarium specimens may be useful in order to detect changes in levels of UV radiation over longer time scales. (Auth.)

B-54258

Petz, W., **Morphology and morphogenesis of *Strombidium kryalis* nov. spec. (Ciliophora, Strombidiida) from antarctic sea ice,** *Archiv für Protistenkunde,* 1994, Vol.144, p.185-195, Refs. p.194-195.

The morphology and morphogenesis of *Strombidium kryalis* sp. n. were investigated using protargol silver impregnation. *S. kryalis* occurs in the brine-filled pore system of antarctic sea ice. The comparatively small adoral zone of membranelles forms an almost closed spiral around the apical area. The ventral adoral membranelles invaginate on this anterior surface. *S. kryalis* possesses a single contractile vacuole. The cytoplasm includes numerous sequestered chloroplasts, some retained from cryptophytes and most from other microalgae. Morphogenesis is enantiotropic, i.e. proter and opisthe are connected by their posterior portions and are 180° inverted during some divisional stages. The oral primordium orignates apokinetally near the cell surface. Subsequently, it moves deeper into the cell and differentiates in a temporary sac. The somatic ciliature forms by 2 rounds of intrakinetal basal body proliferation; the kinetics simply divide. These morphogenetic events confirm a proposed sister-group relationship between Strombidiida (strombidiids) and Oligotrichida (tintinnids and strobilidiids). (Auth.)

B-54259

Øvstedal, D.O., Gremmen, N.J.M., **Two further bipolar lichens,** *Graphis scripta,* 1995, 7(1), p.1-3, 10 refs.

Rhizocarpon copelandii and *Trapeliopsis granulosa* are reported from the Argentine Is. on the west side of the Antarctic Peninsula. Descriptions of the taxa are given, including chemical data. (Auth.)

B-54260

Guyton, G.P., et al, **Myoglobin saturation in free-diving Weddell seals,** *Journal of applied physiology,* Oct. 1995, 79(4), p.1148-1155, 19 refs.

Although the consumption of myoglobin-bound O_2 (MbO_2) stores in seal muscles has been demonstrated during laboratory simulations of diving, this may not be a feature of normal field diving in which measurements of heart rate and lactate production show marked differences from the profound diving response induced by forced immersion. To evaluate the consumption of muscle MbO_2 stores during unrestrained diving, the authors developed a submersible dual-wavelength laser near-infrared spectrophotometer capable of measuring MbO_2 saturation in swimming muscle. The probe was implanted on the surface of the latissimus dorsi of five subadult male Weddell seals released into a captive breathing hole near Ross I. Four seals had a monotonic decline of muscle O_2 saturation during free diving to depths down to 300 m for dives lasting <17 and >17 min, respectively. There was no correlation between the power consumed by swimming and the desaturation rate. Two seals had occasional partial muscle resaturations late in dives, indicating transfer of O_2 from circulating blood to muscle myoglobin. Weddell seals partially consume their MbO_2 stores during unrestrained free diving. (Auth. mod.)

B-54261

Arnould, J.P.Y., Boyd, I.L., Speakman, J.R., **Measuring the body composition of antarctic fur seals *(Arctocephalus gazella)*: validation of hydrogen isotope dilution,** *Physiological zoology,* Feb. 1996, 69(1), p.93-116, 59 refs.

The accuracy of hydrogen isotope dilution, tritium and deuterium was examined as a means of determining the total body water (TBW), and hence body composition, by comparison with whole carcass chemical analysis in five adult female and four pup antarctic seals. On average, tritium isotope (HTO) dilution overestimated TBW by about 2%; deuterium overestimated by about 1.7% Several equations were developed for predicting TBW from hydrogen isotope dilution estimates. These are discussed and compared with whole carcass chemical analyses of the adult females and the pups. With the use of the predictive equations, hydrogen isotope dilution appears to be an accurate means of determining body composition in live antarctic fur seals. (Auth. mod.)

B-54262

Fukunaga, N., et al, **Effects of temperature and salt on lipid and fatty acid compositions of a bacterium isolated from the bottom layer of Lake Vanda, Antarctica,** *Journal of general and applied microbiology,* June 1995, 41(3), p.191-205, 35 refs.

A gram-negative aerobic bacterium isolated from the bottom layer of Lake Vanda can grow in a synthetic medium containing biotin as a growth factor. The lipid and fatty acid compositions of the cells grown in the fatty acid-free medium were analyzed. Phosphatidylethanolamine, phosphatidylglycerol and wax esters were identified as major components of the chloroform-methanol extractable lipids. Palmitoleic and oleic acids comprised more than 90% of the total fatty acid of the lipids when the bacterium was grown at low temperature (5°C). Increasing the growth temperature induced an increase in the average fatty acyl chain length of the phospholipids and a decrease in the unsaturation degree of the fatty acyl chain of the wax esters. Increasing the NaCl concentration in the medium also induced an increase in the average fatty acyl chain length of the phospholipids. (Auth. mod.)

B-54268

Adamson, E., Adamson, H., Seppelt, R.D., **Cement dust contamination of *Ceratodon purpureus* at Casey, East Antarctica:**

damage and capacity for recovery, *Journal of bryology,* 1994, 18(1), p.127-137, 22 refs.

Vegetation downwind of a concrete batching platform at Casey Station has been severely contaminated by cement dust. This paper draws attention to the resilience of the bryophyte *Ceratodon* compared to lichens in the area. Plant and soil samples collected along a 90 m transect passing directly through the most damaged area and running parallel to the predominantly strong easterly winds indicate a strong positive correlation between chlorophyll and carotenoid concentration and high soil pH. The results suggest that elevated pigment levels in plants close to the batching platform are due to enhanced thylakoid production rather than a disproportionate loss of dry matter. Variable (Fv/Fm) fluorescence measurements and growth cabinet experiments indicate that *Ceratodon* from even the most heavily contaminated sites is photosynthetically competent and capable of rapid growth under favorable conditions. (Auth.)

B-54278

Connell, L.B., **Biogeographic observations on South Georgia marine yeasts,** *Antarctic journal of the United States,* 1994, 29(5), p.143, 7 refs.

The purpose of this study was to survey marine yeasts in the subantarctic region near South Georgia and to compare the species collected with those from other antarctic regions. Collections were made during the May and June 1993 cruise of the R/V *Nathaniel B. Palmer.* Sixty-one samples were analyzed. Of these, 47% allowed the retrieval of yeast colonies. Between 1 and 16 colonies were recovered for each 1-liter sample taken. Seventy-two yeast isolates were successfully recovered and subcloned. Of these 72 isolates, 19% were psychrophilic (could not grow at or above 20°C), and 43% grew more rapidly at 20°C than at the temperature at which they were collected (<4°C).

B-54279

Smith, W.O., Jr., White, A.M., Rich, J., Schauer, A., Garrett, M.L., **Phytoplankton biomass in the western Ross Sea: January and February 1994,** *Antarctic journal of the United States,* 1994, 29(5), p.144-145, 4 refs.

During Jan. and Feb. 1994, the authors conducted a cruise on the U.S. Coast Guard Cutter *Polar Sea* to the southern Ross Sea. The purpose of the cruise was to investigate the nitrogen and carbon dynamics of the phytoplankton sampled along 76°30'S. The hydrographic conditions were different from those encountered in previous years: the density stratification was not as pronounced and the nitrate concentrations were nearly always greater than 20 micromolar. Chlorophyll concentrations were low. Results show that the variations in nutrient removal and biomass accumulation at one location in the Ross Sea are indeed substantial. Such variations may affect the food webs dependent on organic material from the surface layer and the local biogeochemical cycles, but their causes remain elusive.

B-54280

Helmuth, B.S., Veit, R.R., Holberton, R., **Dispersal of benthic invertebrates in the Scotia Arc by kelp rafting,** *Antarctic journal of the United States,* 1994, 29(5), p.145-147, 12 refs.

The authors examined the potential for long-distance dispersal of benthic invertebrates in the Scotia Arc in the vicinity of Cape Horn, the Falkland Is., and South Georgia on kelp *(Macrocystis pyrifera)* rafts. Kelp rafts were collected and examined for the presence and abundance of benthic animals, in particular the clam *Gaimardia trapesina,* due to its abundance and the ease in determining its reproductive state. The data indicate that, over geologic time, *G. trapesina* are likely to have been spread throughout and beyond the Scotia Arc by rafting.

B-54281

Sigleo, A.C., Neale, P.J., **Phytoplankton pigment profiles at the Weddell-Scotia Confluence during the 1993 austral spring,** *Antarctic journal of the United States,* 1994, 29(5), p.147-148, 8 refs.

During Oct. and Nov. 1993, the Weddell-Scotia Confluence near 60°S 50°W was delineated by a sharp biomass front about 100 km north of the ice edge. Stations A and B, located within the biomass front, had a well-developed upper mixed layer with a sharp pycnocline at 60 to 80 m depth. Chlorophyll-*a* concentrations in the upper 100 m ranged from 0.1 mg/l south of the front to over 6.5 mg/l north of the front. Large concentrations of the accessory pigments fucoxanthin and chlorophyll-*c* were present, along with significant amounts of the photoprotective carotenoids, diadinoxanthin (DD), and diatoxanthin (DT). The large amount of fucoxanthin is characteristic of diatoms, in accord with the identity of *Thalassiosira gravida* as the predominant species in the water column. The *T. gravida* occurred in large colonies up to several mm in length. The high concentration of accessory pigments in the water-column assemblages suggests adaptation to low-light conditions.

B-54282

Gooday, A.J., Bowser, S.S., Bernhard, J.M., **Foraminifera of Explorers Cove, Antarctica: a deep-sea assemblage in shallow water?,** *Antarctic journal of the United States,* 1994, 29(5), p.149-151, 23 refs.

One goal of the 1993 field season was to obtain a more complete survey of the foraminiferal community in Explorers Cove at the 10-27 m deep study site to compare this shallow, cold-water, oligotrophic community with those from bathyal and abyssal depths in the northeast Atlantic and elsewhere. The foraminifera were obtained by scuba divers using two methods, which are described. Some preliminary observations and conclusions are reported. It was found that there seem to be close parallels between the sublittoral (25-27 m) antarctic assemblage and those recorded from depths greater than 100 m, sometimes considerably deeper, at certain northern high-latitude sites.

B-54283

McClintock, J.B., et al, **Chemical ecology of three antarctic gastropods,** *Antarctic journal of the United States,* 1994, 29(5), p.151-153, 19 refs.

As part of a multidisciplinary program investigating aspects of the chemical ecology of antarctic marine invertebrates, the authors have undertaken studies to investigate antarctic gastropods which are likely to possess chemical means of defense. Although results of previous studies indicated that some antarctic gastropods were noxious to ecologically relevant predators, the secondary metabolites responsible for this bioactivity were unknown. In this paper, the authors review the nature of the bioactive compounds and discuss their possible dietary derivation.

B-54284

Baker, B.J., Yoshida, W.Y., McClintock, J.B., **Chemical constituents of four antarctic sponges in McMurdo Sound, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.153-155, 14 refs.

Antarctic sponges are known to be preyed upon by seastars and/or gastropod mollusks, including the seastar *Perknaster fuscus.* Based on the central role of *P. fuscus* in McMurdo Sound sponge ecology, the authors developed a behavioral bioassay to evaluate the ability of sponges to deter *P. fuscus* and found that many sponges do in fact yield extracts that exert a behavioral effect on it. During austral summer 1993-94, the authors carried out the isolation and characterization of chemical substances from several McMurdo Sound sponges and report here on the defensive nature of substances isolated from *Isodictya erinacea, Dendrilla membranosa, Latrunculia apicalis,* and *Kirkpatrickia variolosa.*

B-54285

Roberts, K.A., Kleppel, G.S., Burkart, C.A., Carter, K., **Egg production of the copepod *Calanoides acutus* (Giesbrecht) in the Weddell Sea during spring,** *Antarctic journal of the United States,* 1994, 29(5), p.155-157, 7 refs.

In this paper, the authors report on the egg production of *Calanoides acutus* in the marginal ice zone in the Weddell Sea between Nov. 27 and Dec. 10, 1993. This study was part of a larger investigation of midtrophic-level production in and around the ice edge during the spring bloom. It is shown that egg production rates were low and that cannibalism was remarkably high during this period. The prymnesiophyte *Phaeocystis pouchetii,* thought not to be consumed extensively by calanoid copepods, was frequently abundant in the water column. The possibility is suggested that high egg production rates during the summer could not be supported by the remaining microplankton biomass, and that under such conditions, cannibalism (which, on average, exceeded 50% of egg production) may be adaptive by conserving copepod biomass for periods when food concentration or quality has improved.

B-54286

Podolsky, R.D., Virtue, P., Hamilton, T., Vavra, J., Manahan, D.T., **Energy metabolism during development of the antarctic sea urchin *Sterechinus neumayeri*,** *Antarctic journal of the United States,* 1994, 29(5), p.157-159, 9 refs.

The feeding larval stage (pluteus) of the antarctic echinoid *Sterechinus neumayeri* develops approximately 20 days after fertilization; the juvenile stage is reached by 115 days. The authors investigated the biochemical and physiological changes that occur during the early development of this species. They measured the changes in respiration during development to the feeding larval stage; changes in enzymes involved in aerobic metabolism; and changes in total protein, total lipid, and specific lipid classes during development.

B-54287

Bernardi, G., DeVries, A.L., **Cytochrome b gene sequences from two eelpouts (perciformes, zoarcidae) from McMurdo Sound (Antarctica): implications on the antifreeze gene structure,** *Antarctic journal of the United States,* 1994, 29(5), p.159-161, 14 refs.

To avoid freezing, several eelpout species that live at subzero temperatures synthesize antifreeze peptides (AFPs). Eelpout AFPs were characterized from *Macrozoarces americanus, Pachycara brachycephalum, Lycodichthys dearborni,* and *Lycodes polaris.* The authors postulate that the extreme compositional and size heterogeneity present in a species like *L. dearborni* have resulted from gene amplification and modification of the amplified genes and represents a relatively old antifreeze gene family. The gene family of *P. brachycephalum,* on the other hand, would appear to be young because it is largely made up of copies of a single 7 KDa protein and only a few of a very similar minor one.

B-54288

Detrich, H.W., III, Williams, R.C., Jr., **Dynamic instability of microtubules from antarctic fishes,** *Antarctic journal of the United States,* 1994, 29(5), p.161-162, 12 refs.

As the southern ocean began to cool approximately 40 mya the antarctic fishes diverged from temperate fishes and evolved molecular, cellular, and physiological adaptations that preserve metabolic efficiency and macromolecular function at their now chronically low body temperatures. Here, the authors describe the dynamic instability of brain microtubules from two antarctic rockcods, *Gobionotothen gibberifrons* and *Notothenia coriiceps.* Results suggest that microtubules from the cold-adapted antarctic fishes are dynamic polymers at low temperatures but much less so than are the microtubules of homeotherms. The greater stability of antarctic fish microtubules, relative to the mammalian polymer, appears to result not from the alteration of one single aspect of dynamic instability but from alteration of them all.

B-54289

Laman, E.A., Loeb, V.J., **RACER: Feeding incidence and yolk resorption in three species of antarctic larval fishes,** *Antarctic journal of the United States,* 1994, 29(5), p.162-164, 8 refs.

This study examines the relationship between feeding incidence and yolk utilization by 3 species of larval fishes collected in Gerlache Strait by the Research on Antarctic Coastal Ecosystem Rates (RACER) program during spring (Oct. and Nov.) 1989. Feeding incidence and yolk utilization were also examined with respect to possibly different feeding conditions within regional hydrographic regimes in Gerlache Strait. The 3 species *Lepidonotothen larseni, Trematomus lepidorhinus,* and *T. newnesi* numerically dominated the 1989 samples. Preliminary results indicate that the 3 species had very different feeding incidence. *T. newnesi* had the highest overall feeding incidence for all regions, followed by *L. larseni* and then *T. lepidorhinus.*

B-54290

Veit, R.R., Silverman, E.D., Hewitt, R.P., Demer, D.A., **Spatial and behavioral responses by foraging seabirds to antarctic krill swarms,** *Antarctic journal of the United States,* 1994, 29(5), p.164-166, 6 refs.

The authors sampled the ocean surrounding South Georgia aboard the R/V *Nathaniel B. Palmer* from May 26 to 27, 1993, with the primary intent of quantifying the numerical and behavioral responses by foraging seabirds to krill swarms. Closely linked with these surveys were studies of circulating hormone levels in seabirds and evaluation of the importance of olfaction to birds searching for food. Since species composition of feeding flocks was clearly not a random assemblage of the species present in the general area, the authors examined the prey distribution under the flocks in an attempt to account for the observed differences between flocks. Krill abundance was variable among flocks but did not differ consistently between the northwest and southeast flocks; however, the vertical distributions of krill did differ.

B-54291

Holberton, R., Wingfield, J.C., **Adrenocortical responses to stress in antarctic seabirds,** *Antarctic journal of the United States,* 1994, 29(5), p.167, 2 refs.

Data from three species of seabirds indicate that the mechanisms of control of glucocorticosteroid release differ between chronic and acute stress. This finding may have considerable import for the modulation of alternate behavioral patterns (and foraging distributions in southern seabirds) triggered by stress.

B-54292

Hodum, P.J., **Foraging ecology and reproductive energetics of antarctic petrels,** *Antarctic journal of the United States,* 1994, 29(5), p.167-168, 9 refs.

The field site for this study on petrels is Hop I. in the Rauer I. group. The field season began on Nov. 5, 1993 and continued until Feb. 18, 1994. This first season provided baseline data on attendance patterns throughout the breeding season, laying dates, incubation period, hatching dates, and nestling survival through the late-nestling period. Chick growth curves were generated from daily nestling morphometric measurements.

B-54293

Nevitt, G.A., **Antarctic procellariiform seabirds can smell krill,** *Antarctic journal of the United States,* 1994, 29(5), p.168-169, 9 refs.

As part of an ongoing study on seabird foraging, the author conducted shipboard experiments designed to test the hypothesis that procellariiforms are able to detect krill at sea using olfactory cues. Preliminary experiments were performed aboard the ship *Surveyor* near Elephant I. during Feb. and Mar. 1993, and continued aboard the R/V *Nathaniel Palmer* near South Georgia during May and June 1993. Combined data from 18 experiments produced a number of compelling results: procellariiforms were more attracted to slicks scented with crude krill extract than to nonscented control slicks. The relative attractiveness of odors differed between species. Results provide intriguing evidence that antarctic procellariiform seabirds use olfactory cues to locate food resources.

B-54294

Kooyman, G.L., **Natural history of emperor penguin colonies of the Ross Sea, 1993,** *Antarctic journal of the United States,* 1994, 29(5), p.170-171, 5 refs.

Since 1986, the author has conducted several types of studies at the emperor penguin colonies of the western Ross Sea. The 1993 data collected include the following: the determination of foraging behavior simultaneously at Coulman I. and Cape Roget; the decline in fledging success at Coulman I.; the absence of leopard seals at Cape Washington; and the re-discovery of a seventh emperor penguin colony in the Ross Sea. Some highlights of the previous season's research are presented.

B-54295

Castellini, M.A., Testa, J.W., Rea, L.D., Moss, J.M., Hastings, K.K., **Diving development and survivorship in Weddell seal pups,** *Antarctic journal of the United States,* 1994, 29(5), p.171-172.

This project has focused on understanding the development of diving in Weddell seal pups and correlating health indexes with survivorship of those pups. Several major components which constitute the project are discussed: diving patterns vs. age in pups; blood chemistry development in intensively studied pups; blood chemistry profiles of a subsection of the pup population; and population parameters of the Weddell seals near McMurdo Station.

B-54296

Stanek, K.S., Roberts, J.D., Zapol, W.M., Falke, K.J., Liggins, G.C., Liggins, J., **Thoracic circumference and nitric oxide activity in the free-diving Weddell seal,** *Antarctic journal of the United States,* 1994, 29(5), p.172-174, 13 refs.

The data show that the reduction of thoracic circumference of the free-diving Weddell seal occurs in two phases. The chest circumference decreases during the initial exhalation. Subsequently, the thorax is gradually compressed with increasing diving depth down to about 40 m. This two-phase reduction of chest circumference supports prior suggestions that airway collapse is graded with depth in the diving Weddell seal. It is significant that seals did not refill their lungs during ascent but only upon the first inhalation at the ice hole after surfacing. This delay prevents nitrogen uptake on ascent into arterial blood and may be a mechanism developed to avoid nitrogen narcosis or decompression sickness. During the recovery period after prolonged dives, no indirect evidence was found of a cGMP increase or modulation of nitric oxide activity in the seals. This lack of evidence suggests that the NO-signal transduction system for vasodilation may not be highly developed in the Weddell seal.

B-54297

Götting, K.J., **Polyplacophora of the Weddell Sea and King George Island, South Shetlands, Antarctica** [Polyplacophora des Weddell-Meeres und von King George Island, Süd-Shetlands, Antarktis], *Archiv für Molluskenkunde,* Feb. 28, 1993, Vol.122, p.171-187, In German with English and Spanish summaries. 24 refs.

The collections of Polyplacophora (Mollusca) made by the German R/V *Polarstern* between 1983 and 1985 in the Weddell Sea contained 4 species: *Nuttallochiton mirandus, Callochiton gaussi, steinenii* and *bouveti.* The locations where they were found are listed. The depths of the habitats are within the limits already given in the literature. *N. mirandus* and *C. gaussi* are obviously widespread in the Weddell Sea. The problem of definition of the *Callochiton* species is discussed. A finding of *Tonicina zschaui* off King George I., South Shetlands, is also described. (Auth.)

B-54303

Hochachka, P.W., et al, **Hormonal regulatory adjustments during voluntary diving in Weddell seals,** *Comparative biochemistry and physiology,* Oct. 1995, 112B(2), p.361-375, 33 refs.

Subadult male Weddell seals were instrumented with microcomputer-based backpacks and were monitored during voluntary diving and recovery periods in McMurdo Sound. The studies found that (i) epinephrine and norepinephrine both increased as a function of diving duration, then rapidly decreased during recovery, (ii) that the changes in catecholamine concentrations correlated with splenic contraction and an increase in circulating red blood cell mass (hematocrit), (iii) that the changes in catecholamines were inversely related to insulin/glucagon ratios, which mediated a postdiving hyperglycemia, and (iv) that in long dives (but not short ones) the changes in catecholamines correlated with increasing reliance on anaerobic metabolism, indicated by increased plasma lactate concentrations. At the end of diving, even while catecholamine concentrations were still high, many of the above effects were rapidly reversed and the reversal appeared to correlate with accelerated nitric oxide production, indirectly indicated by increased plasma cGMP concentrations. Taken together, the data led to a hypothesis of important adrenergic regulation of the diving response in seals, with rapid reversal at the end of the diving and during recovery being regulated by nitroxidergic mechanisms. (Auth. mod.)

B-54304

Schroeter, B., Scheidegger, C., **Water relations in lichens at subzero temperatures: structural changes and carbon dioxide exchange in the lichen *Umbilicaria aprina* from continental Antarctica,** *New phytologist,* Oct. 1995, 131(2), p.273-285, 53 refs.

Carbon dioxide gas exchange measurements in lichens revealed that net photosynthesis and dark respiration occurred at subzero temperatures regardless of whether a lichen thallus saturated with liquid water was exposed to subzero temperatures, or if a dry thallus was re-hydrated only from snow at subzero temperatures. When water-saturated thalli *U. aprina* were slowly cooled at subzero temperatures, ice nucleation activity could be detected at -5.4°C, indicating extracellular freezing of water. With low-temperature scanning electron microscopy (LTSEM) it was demonstrated that extracellular ice formation leads to cytorrhysis in the photobiont cells and to cavitation in the mycobiont cells. Both processes were reversible if the lichen thallus was re-warmed. When dry lichen thalli were covered with snow at subzero temperatures a substantial re-hydration from snow could be observed in LTSEM micrographs and measured gravimetrically. Carbon dioxide gas exchange measurements revealed that metabolic activity was initiated during re-hydration from snow at subzero temperatures. (Auth. mod.)

B-54308

Brouwer, P.E.M., Geilen, E.F.M., Gremmen, N.J.M., Van Lent, F., **Biomass, cover and zonation pattern of sublittoral macroalgae at Signy Island, South Orkney Islands, Antarctica,** *Botanica marina,* 1995, 38(3), p.259-270, Refs. p.269-270.

Antarctic macroalgae have been studied taxonomically and biogeographically, but vegetational zonation patterns are still described intuitively. Quantitative studies on the macroalgal vegetation at Signy I. are scarce. The aims of this study were to provide a more complete species list, to collect information on the distribution and zonation pattern of the algae by studying standing crop and percentage cover of the macroalgae in relation to depth and site, and to quantify the influence of environmental variables on the species composition of macroalgal communities. Transects at two rocky sites, one sheltered and one exposed, were studied in detail using both a photographic and a harvest sampling method. Thirty-six species were identified. Both the number of species and macroalgal biomass were low compared with subantarctic regions. The vertical zonation found was: an ice-abraded zone characterized by *Iridaea cordata,* a zone 5 to 14 m depth dominated by *Desmarestia anceps* and *D. menziesii* and a zone 15 to 25 m characterized by *Himantothallus grandifolius.* Of the four environmental variables studied (depth, substratum, slope, exposure) only depth and substratum were significantly related to the species composition of the algal vegetation. (Auth. mod.)

B-54319

Wang, Z., Norman, F.I., Burgess, J.S., Ward, S.J., Spate, A.P., Carson, C.J., **Human influences on breeding of south polar skuas in the eastern Larsemann Hills, Princess Elizabeth Land, East Antarctica,** *Polar record,* Jan. 1996, 32(180), p.43-50, 18 refs.

Breeding activity of pairs of south polar skuas *(Catharacta maccormicki)* in eastern Larsemann Hills was recorded in five of six austral summers between 1988 and 1994. More detailed observations of breeding success were made in the 1989-90 and 1993-94 summers. Although relatively few skuas nest in the study area, data suggest that there was interannual variation in numbers and locations of territories and chicks fledged. This variation is discussed in relation to increased human activities in the area (development of a summer base and more permanent stations) and to an enhanced access to human-derived foods. It is concluded that there has been some human impact on this species in the Larsemann Hills. (Auth.)

B-54321

Melick, D.R., Jackson, A., Petz, W., **Initial biological survey of the Davis Islands, Vincennes Bay, East Antarctica,** *Polar record,* Jan. 1996, 32(180), p.67-69, 3 refs.

The Davis Is. are of significant faunistic importance to the Vincennes Bay region. Proportionately the size of bird populations compares favorably with that of the Windmill Is. The Davis Is. support bird populations equivalent to about 5-10% of the breeding numbers estimated for similar species in the Windmill Is. The presence of nesting birds and the visitation of non-nesting southern giant petrels and antarctic petrels indicates that the western end of Vincennes Bay is important not only for breeding but also perhaps as a feeding ground. Conversely, the absence of cryptogamic vegetation at the Davis Is. highlights the exceptional floristic richness of the neighboring Windmill Is. region and the opportunistic nature of plant colonization in the antarctic environment. Due to the introduction of flights between Australia's Casey and Davis stations, air operations through this area are expanding, and the four islands supporting bird colonies should be protected from helicopter landings or flyovers. (Auth. mod.)

B-54351

Lovelock, C.E., Jackson, A.E., Melick, D.R., Seppelt, R.D., **Reversible photoinhibition in antarctic moss during freezing and thawing,** *Plant physiology,* Nov. 1995, 109(3), p.955-961, 41 refs.

Tolerance of antarctic moss to freezing and thawing stress was investigated using chlorophyll *a* fluorescence. Freezing in darkness caused reductions in F_v/F_m (ratio of variable to maximum fluorescence) and F_o (initial fluorescence) that were reversible upon thawing. Reductions in F_v/F_m and F_o during freezing in darkness indicate a reduction in the potential efficiency of photosystem I I that may be due to conformational changes in pigment-protein complexes from the desiccation associated with freezing. The absorption of light during freezing further reduced F_v/F_m and F_o but was also reversible. Using dithiothreitol (DTT), which inhibits the formation of the carotenoid zeaxanthin, reduced fluorescence quenching during freezing and reduced concentrations of zeaxanthin and antheraxanthin after freezing in DTT-treated moss was revealed. Reduced concentrations of zeaxanthin and antheraxanthin in DTT-treated moss were partially associated with reductions in nonphotochemical fluorescence quenching. (Auth. mod.)

B-54367

Barcikowski, A., Oleksowicz, A., **Level of biomass and chlorophyll content of the plant communities in the area of the Polish Academy of Sciences station Arctowski, King George Island** [Stan biomasy i zawartości chlorofilu w zbiorowiskach roślinnych okolic stacji PAN im. H. Arctowskiego, Wyspa Króla Jerzego], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.215-217, In Polish.

DLC G578.S955 1989

The level of general biomass varied greatly, from 60 to 1527.8 g dry mass/m^2. The lowest biomass was ascertained in fresh water communities and in a locality damaged by trampling. The highest biomass was found in *Usnea antarctica* communities. On the other hand, the highest level of animal biomass was recorded in *Drepanocladus uncinatus* and *Calliergon sarmentosum* communities, while the highest biomass level in vegetation was in *Deschampsia antarctica, Polytrichum alpinum,* and *Drepanocladus uncinatus* communities. The indicator of chlorophyll in the analyzed communities ranged from 0.33-2.73 g/m^2. The highest and lowest chlorophyll values were correlated with the vegetation biomass levels. (Auth. mod.)

B-54368

Bölter, M., **Bacterial population in mineral soils from Antarctica and its relations to organic nutrients,** XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.220-221.

DLC G578.S955 1989

This investigation took place in summer 1985-1986 in the fellfield ecosystem near Casey Station. The bacterial population structure showed a dominance of bacteria of the size class of small rods with regard to biomass and to small cocci with regard to total number. Estimates of microbial biomass exceed that of bacteria by a factor of 1000 or more. Hence, other organisms like fungi and microalgae have to be considered as main constituents of the microbial biomass in these soils. (Auth. mod.)

B-54369

Kopczyńska, E.E., Ligowski, R., **Occurrence of net phytoplankton in the sea and ice boundary between Elephant Island and the southern passages (Antarctica 1988-1989)** [Występowanie fitoplanktonu sieciowego na granicy morza i lodu pomiędzy wyspą Elephant i południowymi arkadami (Antarktyka 1988/1989)], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.224-226, In Polish. 3 refs.

DLC G578.S955 1989

A collection of net phytoplankton was obtained from the surface layer of water (from 0 to 100 m). Among the approximately 30 species of diatoms identified, *Corethron criophilum* dominated. Generally, the species found in the net phytoplankton were different from those which occurred at the same time in the pack ice. (Auth. mod.)

B-54370

Ligowski, R., **Algae populating drifting sea ice in Antarctica** [Glony zasiedlające dryfuący lód morski w Antarktyce], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.226-227, In Polish.

DLC G578.S955 1989

The investigations took place in Dec. 1988 and Jan. 1989 in the area of the Scotia Sea between the South Shetlands and South Orkney Islands. The types that dominated in the sea ice from the genus Nitzschia were primarily *N. cylindrus* and *N. ourta;* more rarely, *N. neglecta, N. sublineata,* and *N. lecointei.* (Auth. mod.)

B-54371

Kompowski, A., **Structure of borel (*Chaenocephlus aceratus; Pisces, Channichthyidae*) from the South Georgia and South Shetlands region** [Struktura stad borela (*Chaenocephlus aceratus; Pisces, Channichthyidae*) z rejonu Pd. Georgii i Pd. Szetlandów], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.227-229, In Polish.

DLC G578.S955 1989

The aim of this study was to analyze new data dealing with the structure of the borel from several recent seasons against the background of observations from earlier periods. From 1985-1986 to 1987-1988 the total length of 13,144 individuals in the South Georgia region was measured; the age of 1,114 was interpreted based on the otolith. In the Elephant I. region in 1983-1984 as well as in 1986-1987 and 1987-1988, 2,557 and 379 individuals, respectively were examined. In the King George I. region, 522 and 250 individuals were studied. (Auth. mod.)

B-54372

Kompowski, A., Rojas, C., **Studies of age marking in *Parachaenichthys georgianus* (Pisces, Bathydraconidae) from the South Georgia region** [Badania nad oznaczaniem wieku *Parachaenichthys georgianus* (Pisces, Bathydraconidae) z rejonu Pd. Georgii], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.229-232, In Polish.

DLC G578.S955 1989

Samples were taken from Dec. 18, 1987 to Jan. 8, 1988. The total length of 766 individuals was measured. Otoliths as well as various osseous elements were studied. Results from the studies show that otoliths and vertebra are the best for interpreting age. (Auth. mod.)

B-54373

Jażdżewski, K., Teodorczyk, W., Siciński, J., **Amphipod crustaceans (*Amphipoda*) as an important component of the faunal groups on the ocean bottom in the Antarctic sublittoral** [Skorupiaki obunogie (*Amphipoda*) jako ważny składnik zespołów fauny dennej antarktycznego sublitoralu], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar

Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.232-233, In Polish.

DLC G578.S955 1989

Amphipod samples were collected down to a depth of 30 m. The group Amphipoda was highly differentiated taxonomically; over 25 species from 13 families were found: Acanthonotozomatidae, Amphilochidae, Dexaminidae, Eophliantidae, Eusiridae, Haustoriidae, Ischyroceridae, Lysianassidae, Oedicerotidae, Phoxocephalidae, Stenothoidae, Synopiidae, and Thamatelsonidae. (Auth. mod.)

B-54382

Wynn-Williams, D.D., **Detection and simulation of environmental change in Antarctica by image analysis of soil algae,** *Binary, computing in microbiology,* 1994, 6(3), Symposium of the Computer Users Group: Image analysis of microbes in their habitat. Meeting of the Society for General Microbiology, 127th, Warwick University, UK, Jan.5-7, 1994, p.76-77, 5 refs.

Results from Signy I. in the maritime Antarctic and the three new sites in the coastal continental Antarctic suggest that microscopic image analysis of cyanobacteria colonizing moist fellfield soils can provide a sensitive measure of natural and experimental environmental change.

B-54384

Priddle, J., Watkins, J., Murphy, E., **Krill—the ecology of aggregation,** *Ocean challenge,* 1994, 4(3), p.46-50.

A crucial aspect of the biology of krill is the formation of dense aggregations, usually referred to as 'swarms'. Swarms range in size from meters to several kilometers in extent and may contain animals at densities of a few thousand individuals per cubic meter of seawater (i.e. at least one per liter). Here, the authors explore the implications of swarming for krill and for other components of the food web.

B-54385

John, D.M., Tittley, I., Lawson, G.W., Pugh, P.J.A., **Distribution of seaweed floras in the southern ocean,** *Botanica marina,* 1994, 37(3), p.235-239, 24 refs.

An earlier phytogeographical analysis of the marine algal floras of the southern oceans using Detrended Correspondence Analysis enabled the recognition of floristic groupings. In the present analysis, attention is focused on the floras of islands or coastlines (21 sites) lying within the antarctic/subantarctic group. The original database has been amended by the addition of new records from Macquarie I. and South Georgia, and from Terra Nova Bay on Antarctica, and account is taken of subsequent taxonomic changes. The main axis of variation in the ordination analysis of 480 species indicates a general north-south trend rather than a sharp discontinuity between the floras of the antarctic and subantarctic regions. Floristic provinces are not apparent; thus islands like South Georgia and Macquarie lie comparatively close in the ordination despite their vast geographical separation. The species-rich floras of Patagonia, Tierra del Fuego and the Falklands appear to form a grouping. The relatively homogeneous distributions of species in the subantarctic region is attributed in part to dispersal by the eastward-moving West Wind Drift. (Auth.)

B-54386

Dastych, H., McInnes, S., ***Hexapodibius boothi* sp. n., a new species of semi-terrestrial tardigrade from the Maritime Antarctic,** *Hamburg. Zoologisches Museum. Entomologische Mitteilungen,* 1994, 11(149), p.111-117, With German summary. 14 refs.

Hexapodibius boothi sp.n. is described, a new species of semi-terrestrial tardigrade from fellfield mineral soil material at Dundee I. (Auth.)

B-54387

Walton, D.W.H., Shears, J., **Need for environmental monitoring in Antarctica: baselines, environmental impact assessments, accidents and footprints,** *International journal of environmental analytical chemistry,* 1994, Vol.55, p.77-90, 19 refs.

The Protocol on Environmental Protection to the Antarctic Treaty (1991) requires the environmental monitoring of human activities in Antarctica. The objective of such monitoring is to collect environmental information which can be used by decision-makers to help prevent or minimize environmental impact. Applied monitoring, driven by practical management needs, is a relatively new field of inquiry for most antarctic scientists. This paper examines the background to environmental monitoring in Antarctica, the design of monitoring programs, the application of monitoring results to environmental management and future research needs. In particular, it highlights the urgent need for international collaboration to validate data, to effectively utilize scarce resources and devise standard monitoring protocols for wide application amongst the Treaty countries. (Auth.)

B-54389

Pugh, P.J.A., MacAlister, H.E., **Acari of the supralittoral zone on sub-Antarctic South Georgia,** *Pedobiologia,* 1994, 38(6), p.552-565, Refs. p.564-565.

The supralittoral zone on the subantarctic island of South Georgia is marked by tidal debris and lichens similar to those on temperate shores and, uniquely at the site studied, accumulations of whalebone. All substrata are inhabited by mites which form a common but distinctly supralittoral community. The possible effects of some factors associated with these substrata, including microclimate parameters, nutrient availability and mechanical stability, are related to acarine diversity and density. (Auth.)

B-54390

Convey, P., **Sex ratio, oviposition and early development of the antarctic oribatid mite *Alaskozetes antarcticus* (Acari: Cryptostigmata) with observations on other oribatids,** *Pedobiologia,* 1994, 38(2), p.161-168, 24 refs.

Data are presented on oviposition rates of individual female *Alaskozetes antarcticus* (Acari: Cryptostigmata) over the course of a 4 month laboratory study at a constant temperature of 7°C. Although most females carried mature eggs, only a minority laid them, approximately one egg every seven weeks. The presence of other females or males did not alter this rate significantly. Individual females laid eggs singly or in batches deposited over a short period; several females could also contribute to one batch. Development rates were rapid, suggesting that eggs laid early in the short antarctic summer could reach the protonymph stage by the end of that season. Field observations of egg content in *A. antartICUS* and *Halozetes belgicae* suggested differences between the two species. *A. antarcticus* maintained a high egg content (c. 6/female, maximum 14) overwinter, with oviposition commencing early in the subsequent spring, while *H. belgicae* showed a peak monthly mean of c. 2 eggs/female (maximum 2) in late summer followed by a burst of oviposition. *A. antarcticus* samples gave female-biased, and *H. belgicae* male-biased sex ratios for much of the year. This is discussed in the context of differing strategies of energy use and survival. (Auth. mod.)

B-54391

Arnbom, T., Fedak, M.A., Rothery, P., **Offspring sex ratio in relation to female size in southern elephant seals, *Mirounga leonina*,** *Behavioral ecology and sociobiology,* 1994, 35(6), p.373-378, Refs. p.377-378.

The authors studied the relationships between the size of southern elephant seal females at parturition and the size and sex of their pups at South Georgia over four breeding seasons. They found a large individual variation in maternal post-partum mass (range 296-977 kg, n=151). Larger mothers gave birth to larger pups, irrespective of the sex of their pup. Male pups were on average 14% larger than females at birth and consequently more costly to bring to parturition. Results suggest that female southern elephant seals must weigh more than 300 kg if they are to breed at all, and more than 380 kg if they are to give birth to a male pup. Above this threshold the proportion of males among offspring rapidly increases with maternal mass, and stabilizes at a level not significantly different from parity. These results show that smaller female southern elephant seals vary in offspring sex ratio in a way that is consistent with theories on adaptive offspring sex ratio. (Auth. mod.)

B-54393

Jones, R.W., Pudsey, C.J., **Recent benthonic foraminifera from the Western Antarctic Ocean,** *Journal of micropalaeontology,* Sep. 1994, 13(1), p.17-23, Refs. p.22-23.

Approximately 60 species of benthonic foraminifera are recorded from 14 samples collected by the RRS *Discovery* from water depths of 200-4200 m on the Antarctic Peninsula shelf and slope and adjacent waters. Discussion focuses firstly on benthonic foraminiferal abundance, diversity and assemblage composition and the effects of calcite dissolution, and secondly on the characteristic assemblages of the study area and their relationships to water masses. (Auth.)

B-54397

Cordier, J.R., Mendez, A., Mougin, J.L., Visbeek, J.G., **Birds of Thule I., South Sandwich Is.** [Les oiseaux de l'île Thulé, archipel des Sandwich du Sud (59°28'S, 27°20'W)], *L'Oiseau et R.F.O.*, 1981, 51(2), p.147-160, In French with English summary. Refs. p.159-160.

Thule I., the southernmost island of the South Sandwich archipelago, was visited by 15 avian species, 6 of which breed (3 penguins, 1 petrel, 1 skua, 1 gull), 3 probably breed (1 penguin, 1 petrel, 1 storm-petrel), and 6 are vagrant (2 penguins, 3 petrels, 1 tern). Some data are given concerning the numbers and breeding cycles of the breeding species. A comparison is made among the various islands of the American sector of the maritime Antarctic. (Auth.)

B-54409

Priscu, J.C., **Phytoplankton nutrient deficiency in lakes of the McMurdo Dry Valleys, Antarctica,** *Freshwater biology,* Oct. 1995, 34(2), p.215-227, Refs. p.226-227.

The influence of inorganic nitrogen and phosphorus enrichment on phytoplankton photosynthesis was investigated in Bonney, Hoare, Fryxell and Vanda lakes, which lie in the ablation valleys adjacent to McMurdo Sound. Bioassay experiments were conducted during the austral summer on phytoplankton populations just beneath the permanent ice cover in all lakes and on populations forming deep-chlorophyll maxima in the east and west lobes of Lake Bonney. Photoplankton photosynthesis in surface and mid-depth (13 m) samples from both lobes of Lake Bonney were stimulated significantly ($P<0.01$) by phosphorus enrichment (2 µm) with further stimulation by simultaneous phosphorus plus NH_4^- (20 µm) enrichment. Vertical nutrient profiles in concert with low advective flux indicate that new phytoplankton production in these lakes is supported by upward diffusion of nutrients from deep nutrient pools. Neither biochemical reactions nor physical processes appear to be responsible for differences in nutrient deficiency among the studied lakes. The differences may rather be related to conditions which existed before or during the evolution of the lakes. (Auth. mod.)

B-54410

Woakes, A.J., Butler, P.J., Bevan, R.M., **Implantable data logging system for heart rate and body temperature: its application to the estimation of field metabolic rates in antarctic predators,** *Medical & biological engineering & computing,* Mar. 1995, 33(2), p.145-151, 10 refs.

DLC R895.A1I55

The metabolic rate of free-ranging animals is difficult to measure, but of great importance in understanding the interactions of a species with its environment. Heart rate can, if correctly validated and calibrated, give an estimate of metabolic rate, with both a fine time resolution and over long periods. The telemetry of heart rate is well documented, but is not appropriate over long ranges (possibly several thousands of kilometers) or for diving species. An implantable data logger has been developed for the long term recording of heart rate and body temperature. The logger is built using hybrid and ASIC construction techniques, weighs 20 g and measures 55 x 24 x 6 mm. The device is programmable, and its solid-state memory holds over 70 days of data if, for example, heart rate is counted and stored every minute. Current consumption is 155 µA while logging, 50 µA during a programmable initial delay period, and less than 1 µA when the logger closes down after filling its memory. These loggers have been deployed for two field seasons on gentoo penguins, black-browed albatross and fur seals. (Auth.)

B-54411

Andrews, F.G., **Genus *Aridius* Motschulsky in the Falkland and South Georgia Islands (Coleoptera: Lathridiidae),** *Coleopterists bulletin,* 1995, 49(1), p.29-34.

Two new insect species, *Aridius spathe* and *A. hemicarinatus,* from the Falkland Is. are described and illustrated. *Aridius malouinensis* (Champion) is diagnosed and illustrated. A key to three known *Aridius* Motschulsky species from the Falkland Is. area is provided. Comparisons are made to described South American species. (Auth.)

B-54422

Slattery, M., **Comparative study of population structure and chemical defenses in the soft corals *Alcyonium paessleri* May, *Clavularia frankliniana* Rouel, and *Gersemia antarctica* Kukenthal in McMurdo Sound, Antarctica,** Birmingham, University of Alabama, 1994, 109p., AADAA-I95 12270, Ph.D. thesis. Refs. p.102-109.

The antarctic soft corals *Alcyonium paessleri* and *Clavularia frankliniana* are conspicuous members of the shallow (12-33 m depth) hard-bottom communities of Ross I. In the soft-bottom communities of western McMurdo Sound, *Gersemia antarctica* is found in low abundance. Size frequency analyses of the first two populations suggest *A. paessleri* recruits into the community on an annual basis and *C. frankliniana* replaces itself continuously. The population of *G. antarctica* may exhibit two distinct size cohorts; however, there has been no evidence of successful recruitment over a four year period. Despite their rich energetic content and apparent vulnerability to predators, few predation events have been observed. All three species appear to contain a suite of bioactive compounds of varying polarity, which effectively deter potential predators. In addition, *A. paessleri* and *G. antarctica* contain toxic metabolites which apparently serve antimicrobial or antifouling functions. *A. paessleri* also appears to release an allomone, subsequently identified as cholesterol, into the surrounding seawater to ward off predatory seastars. (Auth. mod.)

B-54426

Williams, R., De la Mare, W.K., **Fish distribution and biomass in the Heard Island zone (Division 58.5.2),** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.1-20, With French, Russian and Spanish summaries. 13 refs.

Division 58.5.2 encompasses the southern part of the Kerguelen Plateau, and contains Heard I. and the McDonald Is., an Australian Territory around which a 200-mile EEZ has been declared. In order to assess the potential of this area for commercial fishing, and to obtain some preliminary data for its management, three random stratified surveys were conducted to investigate the distribution, abundance and biology of the most important species, covering a number of years and seasons. Five species were found to be abundant. There were two consistent areas of aggregation of *Champsocephalus gunnari,* but total abundance varied greatly between years. *Channichthys rhinoceratus* has a similar distribution, but abundance is lower and less variable with location and between surveys. *Dissostichus eleginoides* is widespread over those parts of the plateau where waters are more than 300 m deep. Rays were widespread and moderately abundant in waters shallower than 300 m. From these results, it seems that a small fishery of a few hundred tonnes each for *C. gunnari* and *D. eleginoides* may be possible. (Auth. mod.)

B-54427

Duhamel, G., **New data on spawning, hatching and growth of *Champsocephalus gunnari* on the shelf of the Kerguelen Islands,** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.21-34, With French, Russian and Spanish summaries. 16 refs.

Combined studies on the inner and outer northeastern part of the Kerguelen shelf during the 1989-90 to 1993-94 period provide new information on the stock of *Champsocephalus gunnari.* A quarterly program of ichthyoplanktonic and bottom trawl surveys over the inner shelf has enabled a new cohort of fish to be identified each year. However, annual variations in abundance have been observed. During the sampling period the 1988 cohort was dominant on the outer shelf. The three-year cycle observed previously seems to be related to the maturation stage of each current cohort and the relative abundance of spawners-at-age during each winter spawning period. Only once have spawners been observed in large numbers on the inner shelf, during the winter of 1991-92. (Auth.)

B-54428

Macchi, G.J., Barrera-Oro, E., **Histological study on the ovarian development of mackerel icefish *Champsocephalus gunnari* from the South Georgia Islands,** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.35-49, With French, Russian and Spanish summaries. 21 refs.

A histological analysis was carried out on the ovarian development in *Champsocephalus gunnari* caught in the South Georgia and Shag Rocks areas in Feb. and Mar. 1994. Six phases of oocyte development were identified and found to be similar to those described for other species. A gonad maturation scale for studies using microscopes was elaborated and adapted to correspond with the macroscopic (i.e. unaided visual observations) scale commonly used. The first 5 stages correspond to those described macroscopically for various species of Channichthyidae. Stage 6 includes ovaries undergoing oocyte resorption processes, which macroscopically resemble a maturity phase but microscopically conform to a regression stage. In some cases these ovaries present few atretic oocytes; in others a generalized regression was found, which was observed in 41% of mature fish. A high proportion of juvenile individuals (45%) was found, together with a relatively low occurrence of females that spawned or were in condition to spawn in the current season (32%). (Auth.)

B-54430

Kozlov, A.N., **Review of the trophic role of mesopelagic fish of the family Myctophidae in the southern ocean ecosystem,** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.71-77, With French, Russian and Spanish summaries. Refs p.76-77.

Results of research into the trophic relationships of myctophids demonstrate that this group of mesopelagic fish plays a significant role in the community of southern ocean marine organisms. Myctophids have the trophic status of zooplankton consumers. The large amount of meso- and macroplankton consumed by myctophids indicates high abundance and biomass of these fishes. According to a preliminary estimate, the yearly consumption of zooplankton by *Electrona carlsbergi* ranges from 157 to 364 million tonnes. Myctophids occupy the third level in the southern ocean trophic system and are consumers of the second order. Myctophids play a major role as producers, supporting the production of organisms higher up in the food chain (certain species of squid, notothenioids, seabirds and mammals). (Auth.)

B-54431

Butterworth, D.S., Thomson, R.B., **Possible effects of different levels of krill fishing on predators—some initial modelling attempts,** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.79-97, With French, Russian and Spanish summaries. 6 refs.

An initial attempt is made to develop the modelling framework suggested by the Joint Meeting of CCAMLR's Working Group on Krill and Working Group for the CCAMLR Ecosystem Monitoring Program in 1992, in order to investigate the possible effects of krill fishing on krill predators. First, estimates are made of the parameters of predator survival rates as functions of krill abundance, by considering a krill dynamics model incorporating recruitment fluctuations together with preliminary information on adult survival and breeding success patterns for certain krill predator species. A 'one-way' interaction model is developed, in which krill abundance fluctuations impact on the predator population, but not *vice versa.* Computations based on this model indicate that variability in the annual recruitment of krill results in predator populations being less resilient to krill harvesting than deterministic evaluations would suggest. The analyses have also facilitated discussion on the interpretation of the preliminary estimates of adult survival rate provided for some krill predator populations, and on the possibility of biases in their estimation. (Auth. mod.)

B-54432

Agnew, D.J., Phegan, G., **Fine-scale model of the overlap between penguin foraging demands and the krill fishery in the South Shetland Islands and Antarctic Peninsula,** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.99-110, With French, Russian and Spanish summaries. 21 refs.

CCAMLR has been using the total catch of krill taken within 100 km of penguin colonies in their breeding season (Dec. to Mar.) as an index of overlap between the potential foraging areas of penguins and the distribution of the krill fishery in Subarea 48.1 (South Shetland Is.). As this index has proven unsuitable for a number of reasons, an alternative method of calculating an index of fishery-predator interaction has been developed. The new index reflects the functional interaction between these two utilizers of the krill resource and is based on a detailed model of penguin foraging patterns combined with catch positions. This analysis shows that the overlap between the fishery and chinstrap penguins is much greater than for other penguins, and that this overlap has been decreasing since 1988. (Auth.)

B-54433

Ashford, J.R., Croxall, J.P., Rubilar, P.S., Moreno, C.A., **Seabird interaction with longlining operations for *Dissostichus eleginoides* around South Georgia, April to May 1994,** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.111-121, With French, Russian and Spanish summaries. 9 refs.

Longlining operations for *Dissostichus eleginoides* off South Georgia were assessed for incidental mortality and interactions with seabirds. Twenty-seven line sets were observed and 98 deaths of seabirds were recorded over 20 sets; no deaths occurred during hauls. The 16 sets made at night contributed 15% of overall mortality, all of white-chinned petrels *(Procellaria aequinoctialis);* the four day sets contributed 85% of deaths, with giant petrels *(Macronectes* sp), grey-headed albatrosses *(Diomedea chrysostoma)* and black-browed albatrosses *(D. melanophrys)* predominating. Grey-headed albatrosses, whose populations at South Georgia are in serious decline, were disproportionately affected in relation to their numbers near the fishing vessel. Giant petrels may be disproportionately affected in relation to the size of their breeding population at South Georgia when compared to albatrosses. The average mortality rate for the 20 sets was 0.48 birds/1,000 hooks and maximum mortality was 3.12 birds/1,000 hooks. (Auth. mod.)

B-54440

Carcaillet, C., **Effects of pressure (gales and salt sprays) on the composition and structure of the vegetation of well-drained slopes on Possession Island, subantarctic Crozet archipelago** [Effets des contraintes (vents et embruns) sur la composition et la structure de la végétation des pentes drainées de L'île de la Possession (archipel Crozet, subantarctique)], *Canadian journal of botany,* Nov. 1995, 73(11), p.1739-1749, In French with English summary. 37 refs.

A study of the vegetation communities along two transects on the well-drained slope of Possession I. was carried out. The aim was to investigate the structure of the vegetation under permanent pressure from gales and salt sprays and where there was no major perturbation. In the areas protected from gales, a *Blechnum pennamarina* community dominates. This fern hinders the vegetation dynamics in two ways: (i) by forming a very dense canopy that prevents sunlight from reaching shorter plants (passive competition) and (ii) by the accumulation of thick litter resulting from dead fronds. This community thus acts as the "inhibition" model of Connell and Slatyer. In areas exposed to gales and salt spray, *B. pennamarina* partly or completely disappears. The soil surface is consequently covered with several bryophytes and *Azorella selago* that form a mosaic on the soil surface. The vegetation dynamics end at this stage, despite the ability of *B. pennamarina* to colonize moss litter. The bryophyte community probably represents a stational climax stage acting as a "facilitation" model to *B. pennamarina* in an area protected from gales. It is therefore concluded that the fernbrake community constitutes the optimal vegetation development on the slopes of the Possession I. (Auth. mod.)

B-54441

Hlebica, J., **Pioneering science on the frozen frontier,** *Explorations,* 1995, 2(2), p.18-25.

This article chronicles the research interests of marine biologist Gerald L. Kooyman during his expeditions in Antarctica. Kooyman specializes in analyzing and recording the diving behavior of penguins and seals.

B-54446

Bowser, S.S., Gooday, A.J., Alexander, S.P., Bernhard, J.M., **Larger agglutinated foraminifera of McMurdo Sound, Antarctica: are *Astrammina rara* and *Notodendrodes antarctikos* allogromiids incognito?,** *Marine micropaleontology,* Dec. 1995, 26(1-4), International Symposium on Foraminifera, 5th, Berkeley, CA, July 5-9, 1994. Selected papers, p.75-88, 66 refs.

Explorers Cove, an embayment on the oligotrophic western side of McMurdo Sound, is noted for physical and biological similarities to the deep sea. This is an important site for foraminiferal biologists because large, deep-sea-like agglutinated taxa are abundant at depths accessible to scuba divers. Microdissection methods have revealed that many of the giant single-chambered species from this locality display an allogromiid internal organization (i.e., a monothalamous cell body encased by an organic wall or "theca"). High voltage transmission electron microscopy of thick sections were used to examine the theca of *Astrammina rara,* a dominant Explorers Cove species possessing a simple spherical test morphology, and *Notodendrodes antarctikos,* a distinctive arborescent species. The simple gross morphology of *A. rara's* agglutinated test belies the complex ultrastructure of its allogromiid-like theca, and the complex dendritic morphology of *N. antarctikos'* agglutinated test contradicts the simple ultrastructure of its theca. Additional field and laboratory observations on *A. rara* revealed that the agglutinated test can be a transient structure. These observations raise questions regarding the taxonomy and phylogeny of unilocular agglutinated foraminifera and other primitive granuloreticuloseans. The results are also discussed in terms of test function in larger agglutinated foraminifera and the ecology of this important taxon. (Auth. mod.)

B-54447

Chang, S.K., Yoon, H.I., **Foraminiferal assemblages from bottom sediments at Marian Cove, South Shetland Islands, West Antarctica,** *Marine micropaleontology,* Dec. 1995, 26(1-4), International Symposium on Foraminifera, 5th, Berkeley, CA, July 5-9, 1994. Selected papers, p.223-232, 25 refs.

Foraminiferal samples were taken from bottom sediments at Marian Cove in order to determine the depth zonation and foraminiferal species composition. Benthic foraminiferal communities are mainly composed of calcareous, agglutinated, and mixed associations. The Fisher-α diversity of the total assemblage groups is close to 6.0. The dominance/diversity patterns are characterized by low dominance and high diversity. Three zones are recognized at Marian Cove with depth boundaries at 22 and 65.5 m. Areas shallower than 22 m are nearly devoid of foraminifera. Calcareous forms and/or calcareous forms mixed with agglutinated forms are relatively abundant between 22 and 65.5 m, while agglutinated forms dominate below 65.5 m. (Auth.)

B-54449

Cherel, Y., Weimerskirch, H., Duhamel, G., **Interactions between longline vessels and seabirds in Kerguelen waters and a method to reduce seabird mortality,** *Biological conservation,* 1996, 75(1), p.63-70, 45 refs.

A longline fishery for *Dissostichus eleginoides* has recently developed in the vicinity of South Georgia and Kerguelen islands, two internationally important breeding areas for procellariiform birds. The number of hooked birds and a method to reduce mortality were investigated during 13 days of fishing activity in Kerguelen waters in Feb. 1994. Between 100 and 600 seabirds were always observed behind the longline vessel during daytime. The main ship-following species were the white-chinned petrel, giant petrels and the wandering albatross, black-browed albatross and grey-headed albatross. Only diving species were caught on the lines, i.e. the white-chinned petrel (n=36) and the grey-headed albatross (n=2). Marked differences in the mortality rate were observed between day and night and at night when the decklights were on or off. Dumping of homogenized offal during line settings greatly reduced incidental capture of seabirds, mainly because birds were more attracted by offal than by hooked baits. It is proposed that the dumping of offal during line settings should be included in the regulations of the longline fishery for *Dissostichus* in order to minimize seabird mortality. (Auth. mod.)

B-54450

Marquez, M.E.I., Slobodianik, N.H., Ronayne de Ferrer, P.A., Carlini, A.R., Vergani, D.F., Daneri, G.A., **Immunoglobulin A levels in southern elephant seal *(Mirounga leonina)* milk during the suckling period,** *Comparative biochemistry and physiology,* Nov. 1995, 112B(3), p.569-572, 24 refs.

Immunoglobulin A (IgA) levels in milk samples from southern elephant seals at King George I. are reported. IgA levels were determined throughout the suckling period (ca 23 days). The IgA concentration in southern elephant seal milk was lower than in other mammals and, unlike most mammalian milk, was not high during early lactation. There was not a definite pattern in IgA levels, which fluctuated within narrow limits throughout the suckling period. If IgG was present, its level was too low to be detected by the method used. This is the first evidence in southern elephant seal of the possibility of transmission of passive immunity after birth involving secretion of IgA in the milk. (Auth.)

B-54459

Stoecker, D.K., Putt, M., Moisan, T., **Nano- and microplankton dynamics during the spring *Phaeocystis* sp. bloom in McMurdo Sound, Antarctica,** *Marine Biological Association. Journal,* Nov. 1995, 75(4)), p.815-832, 40 refs.

The seasonal development of the microbial food web in eastern McMurdo Sound was investigated during and immediately after the 1990-91 bloom of *Phaeocystis* sp. From Nov. 23 to Dec. 7, which was before the appearance of macroscopic colonies of *Phaeocystis,* both phytoplankton and Protozoa were in low abundance. During the *Phaeocystis* bloom (ca Dec. 10 to Jan. 7), phytoplankton biomass was high and was dominated by colonial and single-celled *Phaeocystis,* but other phytoplankton taxa, including diatoms and photosynthetic dinoflagellates, co-occurred. Heterotrophic nanoplankton and protozoan microzooplankton increased dramatically in biomass during the bloom. In the post-bloom period, the heterotrophic protistan assemblage became very diverse, with numerous trophic linkages within the microbial food web. The abundance and diversity of the heterotrophic protist assemblage suggest that there was little control of protists by metazoans and that the microbial food web, consisting of bacteria, algae and Protozoa, was poorly coupled to metazoan zooplankton. (Auth. mod.)

B-54460

Brey, T., Peck, L.S., Gutt, J., Hain, S., Arntz, W.E., **Population dynamics of *Magellania fragilis*, a brachiopod dominating a mixed-bottom macrobenthic assemblage on the antarctic shelf,** *Marine Biological Association. Journal,* Nov. 1995, 75(4)), p.857-869, 59 refs.

A dense assemblage of the brachiopod *Magellania fragilis* was sampled by trawl and underwater photography during the expedition ANT IX/3 (1991) of RV *Polarstern* on the shelf of the Lazarev Sea. Mean abundance and biomass estimates for *M. fragilis* were 26.15 individuals/m^2 and 1.13 g AFDM/m^2, respectively. Growth bands visible on the shell were interpreted as annual growth marks caused by the strong seasonality of food input to the benthos and were treated as size-at-age data. The annual somatic P/B ratio was very low, and annual production amounted to 0.052 g AFDM/m^2/y at this site. These results indicate that *M. fragilis* is a comparatively slow-growing species with very low annual productivity. (Auth. mod.)

B-54461

Brzeski, M.M., Wojtasz-Pajak, A., Ramisz, A., **Implementation of antarctic krill chitosan in veterinary practice,** Advances in chitin and chitosan: Proceedings from the 5th International Conference on Chitin and Chitosan held in Princeton, New Jersey, USA, 17-20 October 1991. Edited by C.J. Brine, P.A. Sandford, and J.P Zokakis, London, Elsevier Applied Science, 1992, p.79-86, 6 refs.

Chitosan produced from antarctic krill shells according to an original Polish technology has been applied as a biologically active agent in preparations for external use in veterinary practice. Wound healing acceleration and antimicrobial activity have been tested in two series of investigations. The first concerned curing postoperative and traumatic wounds, new and old ones (healing with difficulty), and was conducted on 75 animals. Curing effectiveness was about 99%. The second series of experiments, conducted on 55 sheep and 31 cows, was concerned with curing hoof inflammation caused by microbes of the family Fusiformis. Curing effectiveness was over 90%. On the basis of these results, a final form of the medicine for veterinary use was prepared. (Auth.)

B-54463

García, F.J., Troncoso, J.S., Cervera, J.L., García-Gómez, J.C., **Description of the antarctic notaspidean *Polictenidia tomasi* gen.nov. and sp.nov. (Gastropoda, Opisthobranchia) from the Scotia Sea proposing also a new notaspidean tribe,** *Polar biology,* Feb. 1996, 16(2), p.79-85, Refs. p.84-85.

During the expedition "ANTARTIDA 9101", organized by the Spanish Oceanographic Institute, two specimens of an unknown notaspidean species were collected. These differed considerably from other notaspidean species, mainly by the presence of three gills and a prebranchial sac with large external expansion. Since these specimens have three gills, while members of the order Notaspidea have been described as having only one, this feature is doubly interesting: firstly, from the systematic point of view, the definition of the order has to be modified, and secondly, it generates a phylogenetic discussion of the possible affinity between the notaspideans with one gill and doridaceans, which possess several gills. (Auth.)

B-54464

Knox, G.A., Waghorn, E.J., Ensor, P.H., **Summer plankton beneath the McMurdo Ice Shelf at White Island, McMurdo Sound, Antarctica,** *Polar biology,* Feb. 1996, 16(2), p.87-94, Refs. p.94.

The zooplankton of the under-shelf-ice ecosystem at White I. was investigated during Dec. 1976 and Jan. 1977. The water column was sampled through a hole in the McMurdo Ice Shelf over a water depth of 67 m. Seawater temperatures under the ice shelf ranged from -1.91 to 1.96°C. Dissolved oxygen levels ranged from 5.0-6.05 ml/l in early Dec. to 4.65-4.8 ml/l in late Jan. Current speeds of up to 0.13 m/s were recorded at a depth of 50 m and a predominantly northward flow was detected. Light levels under the shelf ice were low, with less than 1% of the incident light being transmitted to a depth of 3 m. No chlorophyll *a* was detected within the water column throughout the investigation. Mean zooplankton biomass values in the water column ranged from 12 to 447 mg wet weight/m^3 and were similar to values recorded elsewhere from antarctic inshore waters, but were much higher than those recorded from under seasonal sea ice in McMurdo Sound. Thirty-two zooplankton species were recorded. Among the Copepoda there were a number of species, especially among the Harpacticoidea, that had not been found previously in McMurdo Sound and the Ross Sea, but that are known to be associated with ice in other localities in Antarctica. (Auth. mod.)

B-54465

Mitchell, C., Beardall, J., **Inorganic carbon uptake by an antarctic sea-ice diatom, *Nitzschia frigida*,** *Polar biology,* Feb. 1996, 16(2), p.95-99, Refs. p.99.

There have been no studies to date on the mechanisms of inorganic carbon acquisition by antarctic microalgae. Consequently, the authors have examined inorganic carbon (DIC) use in *Nitzschia frigida,* a diatom typical of the antarctic bottom-ice community. The $K_{0.5}(CO_2)$ of photosynthesis in this organism was estimated to be 1.09 μM at pH 7.5. The internal concentration of DIC was approximately 4050 μM at an external [DIC] of 45 μM. At air-equilibration levels of inorganic carbon this would be sufficient for a ten-fold accumulation ratio of CO_2. Cells of *N. frigida* are capable of carbon-dependent photosynthesis at rates that exceed that expected from uncatalysed CO_2 supply to the cell. About 25% of the total carbonic anhydrase activity appears to be associated with the cell surface in *N. frigida.* These results support the hypothesis that *N. frigida,* like many microalgae from temperate waters, has an active carbon-concentrating mechanism, associated with the ability to utilize external HCO_3^- for photosynthesis. (Auth.)

B-54466

Nicolaus, B., Lama, L., Esposito, E., Manca, M.C., Di Prisco, G., Gambacorta, A., ***Bacillus thermoantarcticus* sp. nov., from Mount Melbourne, Antarctica: a novel thermophilic species,** *Polar biology,* Feb. 1996, 16(2), p.101-104, 20 refs.

The novel thermophilic Gram-positive *Bacillus thermoantarcticus,* isolated from geothermal soil near the crater of Mount Melbourne, is described. The organism grows at an optimal temperature of 63°C at pH 6.0, is oxidase-positive, catalase-negative and produces an exopolysaccharide, an exocellular xylanase, an intracellular alcohol dehydrogenase and exo- and endocellular α-glucosidase(s). The sequence of 16S rDNA is very similar to that of *B. thermoglucosidasius;* however, the guanine-plus-cytosine (G+C) content is 8 mol% higher. The type strain is *B. thermoantarcticus* (DSM 9572). A detailed study, comprising genetic characterization with reference strains of *B. thermoglucosidasius* and of mesophilic and facultatively thermophilic bacilli, was therefore undertaken to define the taxonomic position of strain M1. The results show that isolate M1 is a novel species of the genus *Bacillus.* (Auth.)

B-54467

Reid, K., Arnould, J.P.Y., **Diet of antarctic fur seals *Arctocephalus gazella* during the breeding season at South Georgia,** *Polar biology,* Feb. 1996, 16(2), p.105-114, Refs. p.113-114.

The diet of lactating female antarctic fur seals *Arctocephalus gazella* at South Georgia was investigated during the pup-rearing period (Jan./Mar.) of 1991-94. Antarctic krill was the main prey item, occurring in 88% of all scats (n=497), whereas fish occurred in 47% and squid in 5% of all scats. There was considerable intra- and inter-annual variation in the characteristics of krill taken by fur seals. The distribution of krill sizes taken suggests that fur seals are not actively selecting particular sizes of krill and, therefore, that the krill in the diet reflects the krill available around South Georgia. The absence of group 3 krill (44-48 mm in length) in the South Georgia area, as indicated by their absence in the diet of seals, is suggested as a possible reason for low availability of krill and the subsequent reproductive failure among krill predators. The frequency of occurrence of fish was much higher than in previous studies; fish consumption showed a consistent seasonal pattern in 3 of the 4 years studied. (Auth. mod.)

B-54468

Brouwer, P.E.M., **Decomposition in situ of the sublittoral antarctic macroalga *Desmarestia anceps* Montagne,** *Polar biology,* Feb. 1996, 16(2), p.129-137, Refs. p.136-137.

Large amounts of detached antarctic macroalgae accumulate in hollows of the seabed, where decomposition rates of the detached macroalgae are expected to be low, owing to lack of contact of the major part of the macroalgae with the sediment. To determine decomposition rates in antarctic waters, untreated and pre-killed *Desmarestia anceps* fronds contained in nylon net bags were studied for 10 months under natural conditions in Factory Cove, Signy I. Physical decomposition was shown to be more important than microbial decomposition. A weight loss of 40% occurred in untreated material within 313 days, while pre-killed material almost all disappeared within 90 days. Despite the weight loss, changes in chlorophyll *a* content were negligible during the experiment. Changes in the C:N ratio and tissue N indicated low rates of microbial decomposition. Therefore, it was concluded that weight loss was mainly caused by fragmentation, and particles disappearing from the nets accounted for most of the loss of original tissue. It remains unknown as to how long nutrients stay in antarctic macroalgal litter before they become available to the system. (Auth.)

B-54469

La Mesa, M., Arneri, E., Giannetti, G., Greco, S., Vacchi, M., **Age and growth of the nototheniid fish *Trematomus bernacchii* Boulenger from Terra Nova Bay, Antarctica,** *Polar biology,* Feb. 1996, 16(2), p.139-145, Refs. p.145.

Age and growth of the nototheniid fish *Trematomus bernacchii* Boulenger 1902 were estimated by reading the sagittal otoliths of 457 adult specimens caught off Terra Nova Bay in the austral summer 1990-91. Annuli in ground and polished otoliths were examined using a dissecting microscope under reflected light. The Von Bertalanffy growth equation was L_t=273.5 for males (n=122) and L_t=422.2 for females (n=211), where

L is total length in millimeters. Maximum estimated age was 21 years for females and 16 years for males. This is in agreement with the hypothesis that considers slow growth and old age as typical features of antarctic fishes. (Auth.)

B-54470

Cooper, J.M., **Fishing hooks associated with albatrosses at Bird Island, South Georgia, 1992/1993,** *Marine ornithology,* 1995, 23(1), p.17-21, 11 refs.

Six hooks or lines of the types used in longline fishing were removed from or regurgitated by Blackbrowed *Diomedea melanophrys* and Wandering Albatrosses *D. exulans* at Bird I. in 1992-93. Some similar previous observations are reported but this is the highest incidence so far recorded in one season. (Auth.)

B-54471

Aguirre, C.A., **Distribution and abundance of birds at Potter Peninsula, 25 de Mayo (King George Island) South Shetland Islands, Antarctica,** *Marine ornithology,* 1995, 23(1), p.23-31, 25 refs.

The bird community at Potter Peninsula, surveyed during the 1987-89 austral summers, consisted of 10 breeding species: Adélie penguin (14,554 pairs), Gentoo penguin (2325), Chinstrap penguin (265), Southern Giant petrel (75), Wilson's Storm petrel (100-200), Kelp gull (44), South Polar skua (2), Subantarctic skua (20), Antarctic tern (100-200) and Greater sheathbill (15). Four species were frequently sighted as nonbreeding visitors: Macaroni penguin, Pintado petrel, Snow petrel and Imperial cormorant. Six species were occasionally recorded: Antarctic fulmar, Blackbellied Storm petrel, Whiterumped sandpiper, Blacknecked swan, Yellowbilled pintail and Cattle egret. Nest distribution was associated with environmental features. The value of the surveyed area for scientific research and environmental conservation purposes is examined, in light of increased human activities recorded in this area during the last decade. (Auth. mod.)

B-54472

Cooper, J.M., Marais, A.v.N., Bloomer, J.P., Bester, M.N., **Success story: breeding of burrowing petrels (Procellariidae) before and after the eradication of feral cats *Felis catus* at subantarctic Marion Island,** *Marine ornithology,* 1995, 23(1), p.33-37, 20 refs.

Greatwinged petrels and Blue petrels bred more successfully after the eradication in 1991 of feral domestic cats at subantarctic Marion I. The larger Whitechinned petrel did not show such improvement, although percentage burrow occupancy in the late breeding season increased significantly between 1982-83 and 1988-89 for that species, suggesting decreased cat predation during this period of cat control. Breeding success and burrow density of selected species of burrowing petrels should be monitored to ascertain the rate of recovery of their populations now that Marion I. is cat-free. (Auth. mod.)

B-54473

Steele, W.K., Newton, I.P., **New distributional and breeding records of birds in the Ahlmannryggen, Western Dronning Maud Land, Antarctica, 1991-1995,** *Marine ornithology,* 1995, 23(1), p.47-52, 11 refs.

This paper reports bird sightings by South African field parties in the Ahlmann Ridge during 4 summer field seasons from 1991 to 1995, and presents new distributional and breeding records for this area. Only 4 species of birds had previously been reported in western Queen Maud Land: Antarctic petrel, Snow petrel, Wilson's Storm petrel and South Polar skua. All 4 species were recorded during the period under review and a fifth species, the Antarctic fulmar, was sighted. (Auth. mod.)

B-54474

Reid, K., **Oiled penguins observed at Bird Island, South Georgia,** *Marine ornithology,* 1995, 23(1), p.53-57, 8 refs.

This paper presents data on the first observations of oiled seabirds at Bird I. since the British Antarctic Survey (BAS) station there was opened in 1971 and, in particular, since its year-round occupancy started in 1982. Between July 10 and Aug. 1993, 6 sightings of oiled penguins were made, all within 1 km of the BAS station in Jordan Cove. The records are presented in chronological order.

B-54475

Van Wyk, J.C.P., **Unusually coloured penguins at Marion Island, 1993-1994,** *Marine ornithology,* 1995, 23(1), p.58-60, 6 refs.

Unusually colored penguins sighted at subantarctic Marion I. in the Indian Ocean are reported for the period Apr. 1993 to May 1994. Previous reports of unusually colored penguins at Marion I. deal mostly with whitefaced Macaroni penguins. Because whitefaced Macaroni penguins are seen annually at Marion I. in small numbers, new records are not reported here in detail. A total of 17 sightings of whitefaced Macaroni penguins, all thought to be of different birds, was made during 1993-94 at 7 breeding colonies. Twelve birds were observed breeding.

B-54476

Coria, N.R., Favero, M., Silva, P., Casaux, R.J., **Breeding birds at Duthoit Point, Nelson Island, South Shetland Islands, Antarctica,** *Marine ornithology,* 1995, 23(1), p.61-64, 16 refs.

Breeding bird surveys were undertaken during Jan. 4-8, 1994 at Duthoit Point, Nelson I. Numbers of pairs were estimated by direct counts with 8x binoculars and a monocular telescope (12-36x). Counts were made during the incubation periods of Southern Giant petrels, Pintado petrels, Wilson's Storm petrels, Blackbellied Storm petrels, Subantarctic skuas, South Polar skuas and Greater Sheathbills and, during the breeding period, for Gentoo penguins, Adélie penguins, Imperial cormorants, Kelp gulls and Antarctic terns. Distribution of breeding colonies was plotted with the help of aerial photographs taken from a plane at 200 m. Twelve species were found breeding in the study area and are discussed separately. Breeding colonies were distributed mainly along the shoreline, with only a few located on a c. 30 m high plateau.

B-54477

Silva, M.P., Coria, N.R., Favero, M., Casaux, R.J., **New records of Cattle Egret *Bubulcus ibis,* Blacknecked Swan *Cygnus melancorhyphus* and Whiterumped Sandpiper *Calidris fuscicollis* from the South Shetland Islands, Antarctica,** *Marine ornithology,* 1995, 23(1), p.65-66, 17 refs.

Several species of birds that are widely distributed in the southern part of South America have been reported as vagrants in the Antarctic Peninsula region. This paper provides new information on three species: the Cattle egret, Blacknecked swan and Whiterumped sandpiper, observed at King George and Nelson islands during the 1992-93 and 1993-94 summers.

B-54478

Velez, L.G., **Wilson's Storm Petrels *Oceanites oceanicus* breeding at the Bertrab Nunatak, Filchner Iceshelf, Antarctica,** *Marine ornithology,* 1995, 23(1), p.67, 1 ref.

Wilson's Storm Petrels have been reported previously at the Belgrano II Station on Bertrab Nunatak, 5 km from the shelf edge on the Filchner Ice Shelf, but breeding was not confirmed and no census data were given. On Jan. 19, 1992 the author counted 30 widely-spaced Wilson's Storm Petrel nests on rocks behind the meteorological laboratory on the Bertrab Nunatak. Nests contained mainly dead chicks and adults and were lined with egg shells, lichen and mummified chicks. Only one incubating adult, and several birds flying overhead, were seen.

B-54480

Slip, D.J., **Diet of southern elephant seals *(Mirounga leonina)* from Heard Island,** *Canadian journal of zoology,* Aug. 1995, 73(8), p.1519-1528, With French summary. 44 refs.

Stomach contents were lavaged from 76 southern elephant seals at Heard I. between July 1992 and Mar. 1993. Eighty-six percent of stomachs contained cephalopods of 17 species. Numerically the most important was *Psychroteuthis glacialis* (21.1%), and from estimated biomass the most important was *Kondakovia longimana* (40.4%). Three other species were also common prey: *Moroteuthis knipovitchi* (19.4% by estimated biomass), *Moroteuthis ingens* (13.0%), and *Alluroteuthis antarcticus*

(10.2%). Sixty-six percent of stomachs contained fish remains, and four species, *Dissostichus eleginoides, Electrona carlsbergi, E. antarctica,* and *Gymnoscopelus nicholsi,* were identified from otoliths. The diet of adults differed from that of juveniles, particularly pups in their first year. *Martialia hyadesi* was the most important prey of juveniles and represented 57.1% of estimated biomass consumed. The species and size of cephalopods eaten by southern elephant seals are similar to those of other southern ocean predators, particularly some beaked whales. (Auth.)

B-54481
Walker, B.G., Boveng, P.L., **Effects of time-depth recorders on the maternal foraging and attendance behavior of antarctic fur seals (*Arctocephalus gazella*),** *Canadian journal of zoology,* Aug. 1995, 73(8), p.1538-1544, With French summary. 64 refs.

Evaluations were made on the difference in average durations of foraging trips and nursing visits to shore between one group of female antarctic fur seals carrying radio transmitters only, and another group carrying time-depth recorders (TDRs) together with radio transmitters during their first five postpartum foraging trip-nursing visit cycles. Data were collected from 105 different fur seals in five breeding seasons (1989-90 to 1993-94) on Seal I. Average foraging-trip and nursing-visit durations were significantly greater for the seals carrying TDRs and radio transmitters than for seals carrying radio transmitters only. Historically, instrument-effect studies on marine animals have focused on smaller species and large instrument-to-body size ratios. Because of small sample sizes (the number of instruments successfully deployed and retrieved) and the typically variable nature of data from TDRs, the statistical power to detect significant differences due to instrument effects has been low. The evidence of instrument effects on antarctic fur seals has possible implications for studies using devices attached to similar-sized animals: results may not be representative of the natural (non-instrumented) population. (Auth. mod.)

B-54484
Shin, J.H., Seo, Y.W., Rho, J.R., Baek, E.J., **Suberitenones A and B: sesterterpenoids of an unprecedented skeletal class from the antarctic sponge *Suberites* sp.,** *Journal of organic chemistry,* Nov. 17, 1995, 60(23), p.7582-7588, 21 refs.

Suberitenones A and B, sesterterpenoids of an unprecedented skeletal class, have been isolated from the antarctic sponge *Suberites* sp. Structures of these compounds were determined by combined spectral and chemical studies. Absolute stereochemistry has been assigned on the basis of a combination of the Kusumi and Kakisawa modification of Mosher's method and CD measurement. Suberitenone B inhibited the cholesteryl ester transfer protein (CETP), which mediates the transfer of cholesteryl ester and triglyceride between high-density and low-density lipoproteins. In addition, suberitenone A has been chemically transformed to suberiquinol, a hydroquinone derivative. (Auth.)

B-54491
Finotti, E., Paolino, C., Lancia, B., Mercantini, R., **Metabolic differences between two antarctic strains of *Geomyces pannorum*,** *Current microbiology,* Jan. 1996, 32(1), p.7-10, 13 refs.

The metabolic behavior of two fungi strains of *Geomyces pannorum* cultured at different temperatures (4°C and 25°C) was studied by indirect calorimetry. With this method it was possible to evaluate their energy expenditure and the rate of glucose, lipid, and amino acid consumption by measuring the amount of CO_2 produced and the O_2 consumed in order to understand the strategy used to survive at low temperatures. (Auth.)

B-54493
Giese, M., **Effects of human activity on Adelie penguin *Pygoscelis adeliae* breeding success,** *Biological conservation,* 1996, 75(2), p.157-164, 40 refs.

Adélie penguin colonies were exposed to two forms of human activity currently occurring in Antarctica: nest checking for scientific purposes and recreational visits. Hatching success and chick survival at these colonies were compared to those at an undisturbed colony. Six colonies were used—three larger and three smaller. Treatments were each replicated at one colony of each size. For both larger and smaller colonies, hatching success and chick survival were highest at control colonies and lowest at colonies subjected to recreational visits. These differences were statistically significant between smaller colonies where hatching success was 35% lower in the colony subjected to nest checking and 47% lower in the colony subjected to recreational visits. For chick survival these reductions were 72% and 80% respectively. No significant difference was found in breeding success between the two disturbance treatments in either size class. Disturbance treatment and colony size both influenced hatching success and chick survival significantly, but there was no statistical interaction between these parameters. Penguins bred either in the center of a colony or at its periphery had no significant influence upon their breeding success. (Auth. mod.)

B-54501
Ramsay, H.P., Bergstrom, D.M., **Chromosome numbers for three mosses from subantarctic Macquarie Island,** *Bryologist,* Fall 1995, 98(3), p.359-362, 15 refs.

Chromosome numbers are recorded for the first time for three moss species from Macquarie I. They are the first reports worldwide for *Notoligotrichum australe* (Hook. f. & Wils.) G. Smith n=7, and *Muelleriella crassifolia* (Hook. f. & Wils.) Dus. subsp. *crassifolia* n = ca 36, while the chromosome number n=26 for *Pottia heimii* (Hedw.) Hampe confirms previous reports for this species. (Auth.)

B-54504
Alder, V.A., **Tintinnid ecology and associated microzooplankton in the Weddell-Scotia confluence** [Ecología de Tintinnina (ciliata) y microzooplancteres asociados en el área de la confluencia Weddell-Scotia], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.31-35, In Spanish.

DLC G845.5.J67

The specific composition of tintinnids found in the Weddell-Scotia confluence during 1988-1989 cruises consisted of a total of 12 taxa belonging to 5 genera. Their distribution, abundance and relation to the physical, chemical and biological factors in the area are discussed and illustrated.

B-54505
Boltovskoy, D., Alder, V.A., Spinelli, F., **Microplankton horizontal and vertical distribution patterns in the Weddell Sea, Jan. 1989** [Microplancton del mar de Weddell: patrones estivales de distribución horizontal y vertical (Enero de 1989)], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.41-45, In Spanish. 5 refs.

DLC G845.5.J67

Silicoflagellates, dinoflagellates and other microzooplankton, including 16 tintinnid taxa, were counted in the Weddell Sea in Jan. 1989. The averages, compared to those obtained in 1987 in a study in the Weddell and Bellingshausen seas, are found to be very similar.

B-54506
Dadon, J.R., **Thecosomata (Gastropoda) from the antarctic ocean** [Thecosomata (Gastropoda) del océano Antártico], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.49-52, In Spanish. 12 refs.

DLC G845.5.J67

The Thecosomata are holo-planktonic gastropods very frequently found in antarctic waters. In this work, the geographic range of different species from the South Atlantic Ocean is determined, and the significance of morphological variations of *Limacina helicina*, the dominant species, is discussed.

B-54507
Favero, M., **Dietary associations of the sheathbill *Chionis alba* from Potter Peninsula and Half Moon I.** [Asociaciones alimentarias de la paloma antártica *Chionis alba* en las islas 25 de Mayo (King George Is.) y Media Luna (Halfmoon Is.) Shetland del Sur],

Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.55-58, In Spanish. 9 refs.

DLC G845.5.J67

Studies carried out on Potter Peninsula, Jan. 26, 1987-Jan. 28, 1988, and on Half Moon I., Feb. 5-Mar. 4, 1991 show a relationship between the distribution of *Chionis alba* and that of various species of penguins and elephant seals. This is attributed to the sheathbills' foraging opportunities in penguin and seal colonies.

B-54508

Gomez García, V.H., **Hydroponic cultivation, a feasible activity for development in Antarctica** [El cultivo en hidroponia, una actividad factible de desarollo en la Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.69-72, In Spanish.

DLC G845.5.J67

An experiment is reported, carried out at San Martin Station, intended to foster the growth of vegetables and other plants in a soil-free environment for consumption at antarctic stations. Instruments, nutrients and methods used are described in detail, as are the satisfactory results.

B-54509

Orgeira, J.L., **Observations on the avifauna of South Georgia** [Observaciones sobre la avifauna de las islas Georgias del Sur], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.87-90, In Spanish. 6 refs.

DLC G845.5.J67

Results of a census of seabirds, carried out on Mar. 26 and 27, 1991 at South Georgia, are presented. Eighteen species and 1746 individuals were recorded at 44 stations in the area; *Pachyptila desolata* and *Pelecanoides* sp. were dominant. Abundance and species diversity patterns are discussed and shown in graphs.

B-54510

Orgeira, J.L., **Avifauna from the Weddell Sea, 1989-1990** [Avifauna del mar de Weddell, Campaña Antártica 1989/90], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.91-96, In Spanish. 7 refs.

DLC G845.5.J67

Data on seabird population, distribution and species diversity, obtained on board the icebreaker Alte. Irizar cruising in the Weddell Sea from Jan. 20 to Feb. 2, 1990, are discussed and presented in tables and graphs. Twelve species and 13,198 individuals were recorded; *Pygoscelis adeliae, Thalassoica antarctica* and *Sterna paradisaea* were dominant.

B-54511

Visbeek, J.G., Kocmur, S.F., Mendes Garrido, S., **Maintenance and culture of antarctic organisms with control of physical and chemical variables** [Sistema de mantenimiento y cultivo de organismos antárticos con control de variables físicas y químicas], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.99-103, In Spanish. 4 refs.

DLC G845.5.J67

A pilot plant in Buenos Aires, with laboratories designed for the continuation of biological and physiological experimentation with antarctic marine organisms in environmental conditions similar to those in antarctic waters, is described. A diagram of the plant's operations is included.

B-54515

Calviño, E.D., Cantoni, L.A., **Thermal control and data acquisition systems** [Sistema de control térmico y sistema de adquisición de datos], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.121-123, In Spanish.

DLC G845.5.J67

Two systems to be used in the same computer are described and illustrated: one, for thermal control in a marine aquarium for culture of antarctic macroalgae; the other, software allowing data retrieval from various instruments on the same ship.

B-54548

Brey, T., Dahm, C., Gorny, M., Klages, M., Stiller, M., Arntz, W.E., **Do antarctic benthic invertebrates show an extended level of eurybathy?**, *Antarctic science,* Mar. 1996, 8(1), p.3-6, Refs. p.5-6.

Depth distribution data were compared for 172 European and 157 antarctic benthic invertebrate species occurring in the respective shelf areas. Antarctic species showed significantly wider depth ranges in selected families of the groups Bivalvia, Gastropoda, Amphipoda and Decapoda. No differences were found in Polychaeta, Asteroidea and Ophiuroidea, where European species also showed comparatively wide bathymetric ranges. These extended levels of eurybathy in the antarctic benthos may be interpreted either as an evolutionary adaptation or pre-adaptation to the oscillation of shelf ice extension during the antarctic glacial-interglacial cycle. (Auth.)

B-54550

De Mora, S.J., Lee, P.A., Grout, A., Schall, C., Heumann, K.G., **Aspects of the biogeochemistry of sulphur in glacial melt water ponds on the McMurdo Ice Shelf, Antarctica,** *Antarctic science,* Mar. 1996, 8(1), p.15-22, Refs. p.21-22.

The distribution of dimethylsulphide (DMS), together with the precursor dimethylsulphoniopropionate (DMSP) and the oxidation product dimethylsulphoxide (DMSO), was measured in melt waters on the McMurdo Ice Shelf in the immediate vicinity of Bratina I. Conductivity in these sulphate-dominated ponds was extremely variable, ranging from 0.106-52.3 mS/cm. Similarly, chlorophyll *a* concentrations in the pond waters and mats differed considerably. The biomass was dominated by benthic felts of phototrophic cyanobacteria, which might act as a source of biogenic sulphur compounds in the ponds. Very high concentrations of DMSO were ubiquitous in the ponds in the ice-cored moraine region of the ice shelf, with dissolved concentrations 1-2 orders of magnitude greater than those of DMS. It is difficult to ascribe the formation of DMSO solely to the conventionally accepted pathways of DMS oxidation by either bacterial activity or photochemical reactions. A direct biosynthetic production from phytoplankton or bacteria might be involved, which means that DMSO in aquatic environments could act as a significant source of DMS rather than as a sink as generally supposed. (Auth. mod.)

B-54551

Guinet, C., Cherel, Y., Ridoux, V., Jouventin, P., **Consumption of marine resources by seabirds and seals in Crozet and Kerguelen waters: changes in relation to consumer biomass 1962-85,** *Antarctic science,* Mar. 1996, 8(1), p.23-30, Refs. p.29-30.

The total annual food consumption of the seabird and seal community breeding at Kerguelen Is. was estimated for 1985. This biomass included crustaceans, myctophid fish, other fish species, and squid. Four species of top predators, the king penguin, macaroni penguin, elephant seal, and fur seal, consumed 59% and 56% of the amount of prey eaten in 1985 by the whole community of Kerguelen and Crozet islands, respectively. Between 1962 and 1985, population changes of these four species induced 18 and 41% increases in their food consumption at Kerguelen and Crozet islands. Population changes included a moderate increase in the number of macaroni penguins and a marked rise in king penguin populations. Assuming that the diet of king penguins was similar in 1962 and 1985, its population increase will have required a significant increase in the consumption of myctophid fish in Crozet and Kerguelen waters. (Auth. mod.)

B-54552

North, A.W., **Population differentiation by size for 0-age-class**

***Champsocephalus gunnari* at Shag Rocks and South Georgia, CCAMLR subarea 48.3,** *Antarctic science,* Mar. 1996, 8(1), p.31-35, Refs. p.35.

In 1991 *Champsocephalus gunnari* <1 year old were sampled at Shag Rocks on Jan. 18 and off 5 bays on South Georgia between Jan. 19 and Feb. 12. Two separate size-groups of 31-46 mm and 55-87 mm standard length (SL) were found at Shag Rocks. However, samples taken off Possession Bay, South Georgia within two days of those at Shag Rocks contained only one size-group between 24-63 mm SL. The mean and median length of the large size-group at Shag Rocks are significantly larger than those at South Georgia. For those at South Georgia there was an apparent growth of around 0.76% SL/d. Based on this growth rate, the differences between the average size of the larger size group of *C. gunnari* at Shag Rocks and those at South Georgia indicates that they hatched at periods separated by about three months. This and other published evidence suggest there may be separate populations of *C. gunnari* at Shag Rocks and South Georgia. (Auth.)

B-54553

Robertson, G., Newgrain, K., **Food and energy intake rates of adult emperor penguins *(Aptenodytes forsteri)* rearing chicks,** *Antarctic science,* Mar. 1996, 8(1), p.37-44, Refs. p.44.

The food and energy requirements of adult emperor penguins parenting chicks were examined at Auster (about 11,000 pairs) and Taylor Glacier (about 2,900 pairs) colonies during the winter, spring and summer of 1988. Tritiated water-derived estimates of food consumption trebled during the 5-month period of chick care, ranging from 2.3 kg/d in winter when chicks were <5% of adult mass, to 6.3 kg/d in summer, when chicks represented 40-50% of adult mass. These food consumption rates were equivalent to the acquisition of 11.4 MJ/d and 33.4 MJ/d metabolizable energy in winter and summer respectively. Chick provisioning was not accompanied by a major increase in food consumption by adults. The food ration of chicks for the three seasons (42 kg) constituted only about 9.5% of adult maintenance requirements during the same period. Adults consumed an estimated 482 kg of food (including the ration for the chick), which amounted to about 10,700 t and 2,800 t of fish and squid consumed by the breeding populations at Auster and Taylor Glacier, respectively. (Auth.)

B-54554

Schall, C., Heumann, K.G., De Mora, S.J., Lee, P.A., **Biogenic brominated and iodinated organic compounds in ponds of the McMurdo Ice Shelf, Antarctica,** *Antarctic science,* Mar. 1996, 8(1), p.45-48, 18 refs.

During Jan. 1994 seven meltwater ponds on the McMurdo Ice Shelf were investigated for their content of biogenic iodinated and brominated volatile hydrocarbons. This is the first time that 1,2-dibromoethane has been detected as a biogenic substance in the environment. In contrast to many other aquatic systems where CH_3I is found to be the most volatile iodine compound, CH_2I_2 showed the highest concentration in all ponds, falling in the range of 5-20 ng/l. In 3 of the 7 ponds investigated, CH_2ClI was the second most abundant iodinated substance. $CHBr_3$ usually exhibited concentrations in the range of 2.5-8.6 ng/l. $BrCH_2CH_2Br$, not previously observed as a biogenic compound, was found to have concentrations similar to those of bromoform and even exceeded the bromoform content in two ponds as well as the CH_2Br_2 content in all ponds. (Auth. mod.)

B-54555

Webster, J., Hawes, I., Downes, M., Timperley, M., Howard-Williams, C., **Evidence for regional climate change in the recent evolution of a high latitude pro-glacial lake,** *Antarctic science,* Mar. 1996, 8(1), p.49-59, 35 refs.

Lake Wilson, a perennially ice-capped, deep (>100 m) lake at 80°S in southern Victoria Land, was investigated in Jan. 1993. Water chemistry and physical structure showed 3 distinct layers: an upper c. 35 m mixed layer of low salinity, moderately turbid water; a less turbid mid layer 20 m thick of slightly higher salinity and supersaturated with oxygen; and a deep 20 m brackish layer with anoxic conditions in the lower 5 m. Extreme supersaturation of N_2O (up to 400 times air saturation) together with high nitrate concentration were recorded in the deep layer. Phytoplankton biomass and photosynthetic activity were confined to the upper mixed layer. The band of supersaturated dissolved oxygen located at 40-55 m appears to represent a relict layer from when the lake level was lower. The evidence from a comparison of profiles between 1975 and 1993 suggests that Lake Wilson has risen 25 m since 1975, synchronous with a period of lake level rise in the McMurdo Dry Valleys lakes to the north at 77°S. Geochemical diffusion models indicate that Lake Wilson evaporated to a smaller brine lake about 1000 yrs BP, which also fits the pattern shown by the McMurdo Dry Valleys lakes. Climate changes influencing lake levels have thus covered a wide area of southern Victoria Land. (Auth.)

B-54563

Tseĭtlin, V.B., Kolosova, E.N., Mel'nikov, I.A., **Daily vertical migration of antarctic copepods beneath the ice,** *Oceanology,* Feb. 1995, 34(4), p.517-520, Translated from Okeanologiia. 14 refs.

The daily vertical migration of copepods in the ice-covered western part of the Weddell Sea was studied. Sea ice was about 2 m thick with a 0.5 m snow cover. The medium depth of habitation of *Metridia gerlachei* (female) varied from 53 m at night to 175 m in daytime. Copepodite stage V of *Calanoides acutus* performed inverted migration with lesser depth range; they migrated from 198 m in daytime to 258 m at night. Data for *M. gerlachei* vertical migration in ice-covered and ice-free areas of the Weddell Sea were compared. It was shown that in an ice-free area, the medium depth of *M. gerlachei* was 47 m deeper than in an ice-covered area, but the range of migration was greater by 46 m. (Auth. mod.)

B-54564

Pakhomov, E.A., Pankratov, S.A., Gorelova, T.A., **Food web of juvenile antarctic fish,** *Oceanology,* Feb. 1995, 34(4), p.521-532, Translated from Okeanologiia. 38 refs.

Stomach contents of 935 species of juveniles of numerous antarctic fishes were analyzed. The lists of preys of different species consist of a broad spectrum of zooplankters. On the basis of cluster analysis of prey, three trophic groups of juveniles were distinguished. Possible directions and strategies of evolutional adaptation of this group are discussed. (Auth. mod.)

B-54567

Zhong, X.F., Wang, R., **Filtration rate and ingestion rate of antarctic krill measured *in vitro* and *in situ*,** *Antarctic research,* Dec. 1995, 6(2), p.30-42, Refs. p.41-42.

During the summer of 1992-93, krill filtration and ingestion rates were measured by constant volume incubation, flow-through incubation and gut fluorescence method, in the southern Scotia Sea and in the Prydz Bay region. No significant methodological effect was found on measurement of filtration rate if suitable experimental conditions were met regarding animal density and vessel volume. The ingestion rate increased with increased food concentration; the filtration rate did not increase. The ingestion rate obtained by gut fluorescence method showed no correlation with ambient chlorophyll *a* concentration. (Auth. mod.)

B-54568

Li, B.H., Huang, F.P., Lü, P.D., **Separation and identification of phytoplankton pigments from the adjacent waters of Great Wall Station, Antarctica,** *Antarctic research,* Dec. 1995, 6(2), p.43-49, 7 refs.

Pigment separation and identification of phytoplankton samples collected in waters adjacent to Great Wall Station during Mar. 1988-Feb. 1989, using thin-layer chromatographic techniques, is reported. Of the 15 types of pigments separated, 13 were identified according to the R_f values of various marine algal pigments. Features of seasonal variations of phytoplankton pigments in the studied area are discussed. (Auth. mod.)

B-54569

Shu, G.H., Lu, D.D., Wang, Z.P., **Study of nano- and microdiatoms in the intertidal zones of Zhongshan Station, Antarctica,** *Antarctic research,* Dec. 1995, 6(2), p.50-56, 6 refs. For Chinese original see 23B-51733.

The composition and distribution of nano- and microdiatoms in the intertidal zones of Zhongshan Station are discussed. The samples were collected from seven sand-grit flat stations in Jan. 1989 and Feb. 1990. The maximum cell abundance of nano- and microdiatoms occurred at Station B: 0.8 to 3651 x 10^3 and 4.5 to 2618 x 10^3 cells/g sand in Jan. 1989 and Feb. 1990, respectively. The distributional characteristics of nano- and microdiatoms in the intertidal zones included small cell size and high cell abundance. The dominant species was *Navicula glacieri.* (Auth. mod.)

B-54577

Sun, S., Wang, R., **Study on the relationship between the crystalline cone number and the growth of the antarctic krill,** *Antarctic research (Chinese edition),* 1995, 7(4), p.1-6, In Chinese with English summary. 13 refs.

Correlation between body length and the number of the crystalline cone in the compound eye of the antarctic krill *Euphausia superba* Dana was examined. From the samples collected in the late summer, there is an apparent exponential relationship between crystalline cone and the body length. From the laboratory population, it seems that when the krill shrink, the crystalline cone number does not decrease. The ratio of crystalline cone number to body length offers a method for detecting the effect of shrinking in natural populations of krill. (Auth.)

B-54579

Zhong, X.F., Wang, K., **Laboratory study on the fecundity of antarctic krill,** *Antarctic research (Chinese edition),* 1995, 7(4), p.17-22, In Chinese with English summary. 16 refs.

The spawning habits including brood size, number of broods, and ovarian development of spawned females of 53 gravid females of antarctic krill *Euphausia superba* Dana were investigated on board the *JiDi* during the summer of 1992-93 in the Prydz Bay region. Most of the females spawned only once. The brood size ranged from 225 to 5919 eggs with an average of 2132. Only two females spawned again 5 and 7 days after the first spawning, with brood sizes of 516 and 492, respectively. There were only a few (average of 32), mature oocytes in spawned ovaries. The regeneration of oocytes was not observed during 1-39 days after the spawning. The brood size increased with body weight and body length, but the correlations were poor. (Auth.)

B-54582

He, J.F., Chen, B., **Vertical and seasonal variations in biomass of ice algae in the vicinity of Zhongshan Station, Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(4), p.53-64, In Chinese with English summary. Refs. p.63-64.

The ice algae communities at three sites near Zhongshan Station were monitored from Apr. to Dec. 1992; the maximum ice thickness was 1.74 m in Nov. Two or 3 cm of brown layers occurred in the bottom ice in late Apr. and Nov., with highest chlorophyll *a* values of 88.3 and 2810 mg/m^3, respectively. The comparing cell numbers were 3.5 x 10^6 and 1.21 x 10^8 cells/l. The maximum integrated chlorophyll *a* value was 59.7 mg/m^2 in Nov., never exceeding 6 mg/m^2 before mid Oct. Most of the biomass occurred in the bottom ice and more than 95% of it was concentrated in the bottom 15 cm ice layer during bloom. The dominant diatoms included *Nitzschia lecointei, N. barkleyi* and *N. cylindrus* in the fall, and *Amphiprora kjellmanii, Berkeleya rutilans,* and *N. lecointei* in spring. Results show that the composition of dominant species of ice algae and the biomass in austral spring were similar to these of other fast ice sites in East Antarctica, but very different from those of the subantarctic regions. (Auth. mod.)

B-54585

Zhou, Y.L., Zhang, Z.W., Cao, J.Z., Ji, J.H., Wu, P.C., **Chromosome observation of 3 moss in the King George Island, Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(4), p.80-82, In Chinese with English summary. 8 refs.

Chromosome numbers of three types of moss from King George I. are reported as follows: *Drepanocladus uncinatus* n=14; *Chorisodontium aciphyllum* n=10; and *Polytrichastrum alpinum* n=7. (Auth.)

B-54586

Ainley, D.G., Nur, N., Woehler, E.J., **Factors affecting the distribution and size of pygoscelid penguin colonies in the Antarctic,** *Auk,* Jan. 1995, 112(1), p.171-182, 46 refs.

Using census data on three species of pygoscelid penguins, this study examines a prey-depletion hypothesis which predicts that a negative correlation should exist between colony population size and the total number of breeding pairs from other colonies within parental foraging range. Also tested was the possibility of a negative correlation between colony size and the population size of, or distance to, the nearest neighboring colony. Suitable data were available for Adélie, Chinstrap, and Gentoo penguins along the coasts of Victoria Land and the Antarctic Peninsula. Results indicated that colonies were highly clustered, with small colonies grouped around one or two large ones, in turn spaced widely. Depending on species, two different patterns of geographic structuring were observed. For the Adélie and Gentoo penguins, no significant negative correlation existed between colony size and the total number of pairs breeding within parental foraging range of the reference colony; however, a significant negative correlation occurred at 150 and 200 km, well beyond foraging range. The authors confirmed the hypothesis previously put forward that prey depletion by parents feeding chicks cannot explain size structuring of seabird colonies where breeding-season food supply is superabundant, as in polar regions; however, prey depletion is not a necessary condition for negative size structuring. (Auth. mod.)

B-54604

Isaksen, M.F., Jørgensen, B.B., **Adaptation of psychrophylic and psychrotrophic sulfate-reducing bacteria to permanently cold marine environments,** *Applied and environmental microbiology,* Feb. 1996, 62(2), p.408-414, 53 refs.

The potential for sulfate reduction at low temperatures was examined in two different cold marine sediments, Mariager Fjord (Denmark), which is permanently cold (3 to 6°C) but surrounded by seasonally warmer environments and the Weddell Sea, Antarctica, which is permanently below 0°C. The rates of sulfate reduction were measured by the $^{35}SO_4^{2-}$ tracer technique at different experimental temperatures in sediment slurries. In sediment slurries from Mariager Fjord, sulfate reduction showed a mesophilic temperature response which was comparable to that of other temperate environments. In sediment slurries from Antarctica, the metabolic activity of psychrotrophic bacteria was observed with a respiration optimum at 18 to 19°C during short-term incubations. However, over a 1-week incubation, the highest respiration rate was observed at 12.5°C. Growth of the bacterial population at the optimal growth temperature could be an explanation for the low temperature optimum of the measured sulfate reduction. The potential for sulfate reduction was highest at temperatures well above the *in situ* temperature in all experiments. (Auth. mod.)

B-54605

Tibbles, B.J., Harris, J.M., **Use of radiolabelled thymidine and leucine to estimate bacterial production in soils from continental Antarctica,** *Applied and environmental microbiology,* Feb. 1996, 62(2), p.694-701, 60 refs.

Tritiated thymidine incorporation (TTI) into DNA was used to examine bacterial production in two soil types from the Robertskollen group of nunataks in northwestern Queen Maud Land, providing the first estimates of bacterial production in soil habitats on the antarctic continent. Although estimates of bacterial productivity in soils near to bird nests were higher than those for soils from beneath mosses, these differences were not significant because of patchiness of bacterial activity (P>0.05). Derived estimates of bacterial production were similar when incubations of 3 h were used, although incubations as short as 1 h were sufficient for measurable uptake of radiolabel. Dual-label incorporation of [^{3}H] thymidine ([^{3}H]TdR) into DNA and [^{14}C] Leu into protein indicated that TTI did not reflect bacterial production of *in situ* assemblages when incubations were longer than 3 h. Isotope dilution analysis indicated that dilution of the specific activity of exogenously supplied [^{3}H]TdR by de novo synthesis of TdR precursor could be limited by additions of [^{3}H]TdR at a concentration of 1 nmol per ca. 115 mg of soil. (Auth. mod.)

B-54606

Child, C.A., **Antarctic and Subantarctic Pycnogonida: III. The family Nymphonidae,** *American Geophysical Union. Antarctic research series,* Dec. 29, 1995, Vol.69, Biology of the antarctic seas 24, p.1-68.

This report examines 48 species of Pycnogonida in the family Nymphonidae from antarctic and subantarctic localities, collected by American government-sponsored organizations from the 1950s through the 1980s. More than 10,400 specimens are listed with about 6500+ of these recognized as *Nymphon australe* and its single variety, *N. australe* var. *caecum*. The other 3500+ specimens encompass 46 other species in four genera, with 14 species described as new. Sets of some species are assembled into two previously unrecognized discrete groups with several related characters; the *Australe* group, and the *Hamatum* group. The remaining species are not assigned to a group because they are not closely related by a suite of similar characters. The 14 new species are described, illustrated, their distribution is given, and they are compared with known related species. The 34 known species are diagnosed and their latest known distribution is given. (Auth. mod.)

B-54607

Child, C.A., **Antarctic and Subantarctic Pycnogonida: IV. The families Colossendeidae and Rhynchothoraxidae,** *American Geophysical Union. Antarctic research series,* Dec. 29, 1995, Vol.69, Biology of the antarctic seas 24, p.69-112.

This report treats the families Colossendeidae with 23 antarctic species in three genera and Rhynchothoraxidae with three antarctic species in a single genus. Five new species of *Colossendeis* are described; *C. brevirostris, C. concedis, C. elephantis, C. ensifer,* and *C. notialis.* Each reported species has the original literature citation of the type along with other important literature, material examined, current distribution, a diagnosis, and comparison remarks. Each new species, in addition to the above sections (lacking diagnosis), has a full description, measurements, and a set of illustrations. Current knowledge of the distribution of antarctic species is discussed and their frequencies of capture are tabulated. (Auth.)

B-54608

Child, C.A., **Antarctic and Subantarctic Pycnogonida: V. The families Pycnogonidae, Phoxichilidiidae, Endeididae, and Callipallenidae, including the genus *Pallenopsis*,** *American Geophysical Union. Antarctic research series,* Dec. 29, 1995, Vol.69, Biology of the antarctic seas 24, p.113-165, Refs. p.161-165.

This final report in a series of 5 describing antarctic and subantarctic pycnogonids treats 37 species with 7 reported as new in 4 of the smaller families represented in Antarctica. The family Pycnogonidae, represented by 6 species, has one new species in the rare decapodous group, *Pentapycnon bouvieri.* The family Phoxichilidiidae, with more than 100 known species worldwide, has minor antarctic representation, with 8 species reported, 3 of which are new. A single known species of the family Endeididae is represented in antarctic waters, and is reported here with new records. The Callipallenidae has the largest representation with 20 species, 3 of which are new. New collecting records, distribution, and diagnosis are given for all 30 of the known species of the 4 families represented, and a full description and illustrations are included for the 7 new species. One other species, *P. (P.) macronyx* Bouvier, which does not have readily available illustrations for its identification, is redescribed and illustrated. (Auth. mod.)

B-54610

Baker, B.J., Kopitzke, R.W., Yoshida, W.Y., McClintock, J.B., **Chemical and ecological studies of the antarctic sponge *Dendrilla Membranosa*,** *Journal of natural products,* Sep. 1995, 58(9), p.1459-1462, 16 refs.

The sponge *Dendrilla membranosa,* a conspicuous member of the antarctic benthos that appears to be free of predation, produces several norditerpenes, including the previously unreported dendrillin *1,* as well as amino acid and nucleotide derivatives. The norditerpenes, previously implicated as chemical defense agents, displayed no deterrent effect toward the chemosensory tube-feet of the major antarctic sponge predator, the sea star *Perknaster fuscus.* (Auth.)

B-54611

Laybourn-Parry, J., Perriss, S.J., **Role and distribution of the autotrophic ciliate *Mesodinium rubrum* (Myrionecta rubra) in three antarctic saline lakes,** *Archiv für Hydrobiologie,* Dec. 1995, 135(2), p.179-194, 35 refs.

The microbial plankton of three saline lakes (Highway Lake, Ace Lake and Lake Abraxas) in the Vestfold Hills was investigated during the austral summer of 1993. The three lakes span the salinity range from brackish to seawater. In the two deeper meromictic lakes (Ace and Abraxas) the distribution of the microbial components was related to the chemical and physical characteristics of the water column. Heterotrophic flagellates and ciliates were most abundant above the chemocline in oxygenated epilimnetic waters, while bacteria numbers increased dramatically in the water below the chemocline. In the shallower lake, where the water column has a uniform conductivity and temperature, vertical distribution of the microbial plankton displayed a different pattern. The ciliate concentration in that lake was extremely high. *Mesodinium rubrum* was abundant in all three lakes during Nov. and Dec. Primary productivity measurements in two of the lakes indicate that *Mesodinium* may be contributing between 15-40% of carbon fixation in the phytoplankton. (Auth. mod.)

B-54636

Fumanti, B., Alfinito, S., Cavacini, P., **Floristic studies on freshwater algae of Lake Gondwana, northern Victoria Land (Antarctica),** *Hydrobiologia,* Dec. 8, 1995, 316(2), p.81-90, Refs. p.89-90.

Benthic algal mats and phytoplankton of Lake Gondwana (northern Victoria Land) were investigated. Biomass, chlorophyll content and floristic analyses were carried out on algal mats. The mats are composed of two layers differing in color, floristic composition and chlorophyll content. The algal flora of the mats amount to 34 taxa (19 *Cyanophyta,* 6 *Bacillariophyta,* 8 *Chlorophyta).* The phytoplankton community is species-poor (only 5 taxa). *Cryptophyta* account for ca. 98% of total algal density. (Auth.)

B-54637

Pastor de Ward, C.T., ***Deontostoma* species from subantarctic coasts (Nematoda, Leptosomatidae),** *Hydrobiologia,* Nov. 24, 1995, 315(3), p.177-187, Refs. p.186-187.

Two new *Leptosomatidae* species are described: *Deontostoma conicum* sp. nov., characterized by two conical odontia and transversal striae on the distal end of the gubernaculum, and *Deontostoma duanei* sp. nov., characterized by laterally directed odontia, specific measurements and gubernaculum morphology. Additional information is given on *Deontostoma antarcticum* (Linstow, 1892) and *Deontostoma campbelli* (Ditlevsen, 1921) from Antarctica and the subantarctic islands. (Auth. mod.)

B-54640

Ryland, J., **Antarctic floating Bryozoa were collected by the 1925-1927 *Discovery* Expedition,** *NERC news,* Jan. 1996, No.34, p.11.

In response to an article published in 1995 by three British Antarctic Survey scientists, reporting the discovery of a floating bryozoan in antarctic waters, the author argues that the unique floating bryozoan *Alcyonidium* was first sighted by Sir Alister Hardy during the *Discovery* antarctic expedition of 1925-1927.

B-54642

Hayward, P.J., **New species in the Antarctic genus *Toretocheilum* (Bryozoa: Cheilostomatida),** *Journal of natural history,* Feb. 1996, 30(2), p.299-302, 1 ref.

The antarctic bryozoan species *Toretocheilum absidatum* Rogick, 1960 is redescribed, and distinguished from a new species of the genus; both are illustrated using scanning electron microscopy. *Toretocheilum* species develop unilaminar patches of thickly calcified autozooids, with cryptocystidean frontal shields bordered by frontal septula. The primary orifice bears a small sinus emphasized by massive condyles overlain by frontal cusps. *T. absidatum* has rugose calcification and large adventitious avicularia; *T. turbinatum* is smoothly calcified, lacks avicularia and bears a massive suboral umbo. (Auth.)

B-54647

Wöhrmann, A.P.A., **Antifreeze glycopeptides and peptides in Antarctic fish species from the Weddell Sea and the Lazarev Sea,** *Marine ecology progress series,* Jan. 11, 1996, 130(1-3), p.47-59, Refs. p.57-59.

Antifreeze glycopeptides and peptides have been isolated from 37 species of antarctic fish representing the families Nototheniidae, Artedidraconidae, Bathydraconidae, Channichthyidae, Muraenolepididae, Liparididae, Zoarcidae and Myctophidae. Amino acid and carbohydrate analysis as well as antifreeze activity indicate that all investigated notothenioids contain antifreeze glycopeptides (AFGP). *Pleuragramma antarcticum, Lepidonotothen kempi, Bathydraco marri* and *Dolloidraco longedorsalis* synthesize additional antifreeze molecules. The non-notothenioid species possess antifreeze peptides (AFP), except *Muraenolepis marmaratus* and *Macrourus holotrachys*, which possess a glycosylated antifreeze peptide similar to the AFGP found in the notothenioid species. A novel glycopeptide comprised of the carbohydrate residue N-acetylglucosamine and the amino acids asparagine, glutamine, glycine, alanine, and traces of arginine, valine, leucine and threonine was isolated and characterized from *P. antarcticum*. The level of antifreeze concentration was dependent on the ambient water temperature, the depth of catch and life cycle of the species. The structural diversity of antifreeze molecules and their occurrence in a wide range of arctic and antarctic fish species suggest that they evolved from precursor proteins before the continental drift and recently during Cenozoic glaciation into the various antifreeze molecules. (Auth. mod.)

B-54648

Atkinson, A., **Subantarctic copepods in an oceanic, low chlorophyll environment: ciliate predation, food selectivity and impact on prey populations,** *Marine ecology progress series,* Jan. 11, 1996, 130(1-3), p.85-96, Refs. p.95-96.

Copepod feeding rates and food selectivity were measured at an oceanic subantarctic site over 5 d in Feb. 1994. A series of gut fluorescence and gut evacuation experiments was carried out for species ranging in size from *Oithona similis* to *Pleuromamma robusta*. Copepod biomass was dominated by copepodite CV of *Calanus simillimus*. Numerically, however, *Oithona* spp. (mainly *O. similis)* constituted 85% of the copepods. These 2 species dominated copepod grazing and contributed to community grazing in about equal proportions. Chl *a* concentrations were low and were comprised of mostly nano- and picoplankton. Low daily phytoplankton carbon rations were derived from the 2 methods which measured total chl *a* consumption. These ranged from 1.5% to 34% of body carbon (late stage copepodites of *Oithona* spp.). These values were generally well below their estimated respiratory requirements, and probably reflected phytoplankton shortage because clearance rates were fairly high. (Auth. mod.)

B-54649

Metz, C., Schnack-Schiel, S.B., **Observations on carnivorous feeding in Antarctic calanoid copepods,** *Marine ecology progress series,* Dec. 14, 1995, 129(1-3), p.71-75, Refs. p.74-75.

Feeding experiments were carried out on board RV *Polarstern* in Feb. 1994 in the Bellingshausen Sea to investigate carnivorous feeding in dominant large calanoid copepods. Adult females of the winter diapause species *Calanoides acutus* and *Rhincalanus gigas* did not feed on females of the poecilostomatoid copepod *Oncaea curvata*. In contrast, adult *Calanus propinquus* and *Metridia gerlachei* females, which remain active during winter, fed on *O. curvata* females. However, no feeding on *O. curvata* females by juvenile *M. gerlachei* was observed. Additional food sources, such as detritus and small protozooplankton, are suggested, because the amount of animal prey ingested is not sufficient to meet the energy demands of the investigated species. (Auth.)

B-54650

Kang, S.H., Lee, S.H., **Antarctic phytoplankton assemblage in the western Bransfield Strait region, February 1993: composition, biomass, and mesoscale distributions,** *Marine ecology progress series,* Dec. 14, 1995, 129(1-3), p.253-267, Refs. p.266-267.

The distribution, biomass, and species composition of phytoplankton assemblages were studied in western Bransfield Strait during Feb. 1993. Diversity of phytoplankton species was low. Only 5 or 6 species accounted for more than 95% of the total phytoplankton carbon biomass. Distribution of autotrophic nanoflagellates (<20 µm) showed a marked contrast to that of diatoms. Waters in the Bransfield Strait region were characterized by a dominance of nanoflagellates such as *Cryptomonas* sp. and *Phaeocystis antarctica* (motile stage), accounting for 83% of the total phytoplankton carbon. In the Drake Passage area, however, diatoms such as the nanoplanktonic *Fragilariopsis pseudonana* and the microplankton (>20 µm) *Rhizosolenia antennata* f. *semispina* accounted for 84% of the total phytoplankton carbon. It is found that mesoscale distributions of phytoplankton species reflect the physical conditions of the upper water column, particularly the profile of vertical stability of the water. (Auth. mod.)

B-54651

Cherel, Y., Weimerskirch, H., **Seabirds as indicators of marine resources: black-browed albatrosses feeding on ommastrephid squids in Kerguelen waters,** *Marine ecology progress series,* Dec. 14, 1995, 129(1-3), p.295-300, Refs. p.299-300.

The species, distributions and abundances of squids in the southern ocean are difficult to assess by conventional oceanographic means. The study of the food and feeding ecology of squid-eating predators such as procellariiform seabirds appears to be a supplemental way to collect useful information on cephalopod biology. Regurgitations were collected from 52 chicks of the black-browed albatross *Diomedea melanophrys* at Kerguelen Is. in Feb. 1994. Squid beaks of the family Ommastrephidae amounted to 55% (n=348) of the accumulated squid beaks. Two species of ommastrephids equally dominated the squid diet, *Martialia hyadesi* (only found once in Kerguelen waters) and a *Todarodes* species, probably *T. angolensis*, previously unknown in the area. The concomitant satellite tracking of 16 adult birds over a total of 35 foraging trips identified their main feeding areas as the inner shelf break to the NE and over a bank to the SE of the Kerguelen Is. Taken together, albatross dietary and foraging data indicate that juveniles of *M. hyadesi* and *Todarodes* sp. concentrate over the upper shelf slope to the east of the Kerguelen Is., some of them occurring in the top 5 m of the water column where they are taken by albatrosses. (Auth. mod.)

B-54652

Feller, G., Sonnet, P., Gerday, C., **β-lactamase secreted by the Antarctic psychrophile *Psychrobacter immobilis* A8,** *Applied and environmental microbiology,* Dec. 1995, 61(12), p.4474-4476, 20 refs.

A class C β-lactamase has been purified from the culture supernatant of the antarctic psychrophile *Psychrobacter immobilis* A8. This psychrophilic β-lactamase displays a low level of thermal stability and a low optimal temperature of activity. In contrast to other cold-adapted enzymes, its level of specific activity is not higher than that of mesophilic class C β-lactamases. (Auth.)

B-54657

Gal'chenko, V.F., Bol'shiianov, D.IU., Chernykh, N.A., Andersen, D., **Bacterial processes of photosynthesis and dark carbon dioxide assimilation in the lakes of Bunger Hills Oasis in Eastern Antarctica,** *Microbiology,* Nov.-Dec. 1995, 64(6), p.706-716, Translated from Mikrobiologiia. 26 refs.

Photosynthetic and dark assimilation of carbon dioxide was studied in both perennially and temporarily ice-covered lakes of Bunger Hills. The intensity of these processes in the lakes studied varied from 0.08 to 326 mg C/(m^3 day) and correlated with water mineralization. Irrespective of the character of ice-cover, the chemical composition of water in antarctic water ecosystems affected the organic matter photoproduction to a greater extent than the intensity of photosynthetically available radiation. With the method of polymerase chain reaction, the predominance of oxygenic phototrophic microorganisms carrying the RuBisCO genes was revealed in all the lakes examined. The results obtained and the literature data unambiguously point to the photosynthetic production of organic matter by cyanobacteria as the main biogeochemical process that determines all the other metabolic strategies in antarctic water ecosystems studied to date. (Auth.)

B-54658

Seppelt, R.D., **Phytogeography of continental antarctic lichens,** *Lichenologist,* [Dec.] 1995, 27(6), Papers presented in the Symposium "Alpine and Polar Lichenology" at the International Mycological Congress, Fifth, Vancouver, 15-16 Aug., 1994, p.417-431, 68 refs.

The northern and southern polar regions differ substantially in topography, climate, terrestrial habitats and in their biota. The arctic flora comprises around 900 flowering plants, 600-700 bryophytes and 2000 lichens. The antarctic flora is depauperate by comparison, with only two flowering plants, 100-200 bryophytes, and probably only around 200 lichens. Despite considerable taxonomic uncertainty, broad phytogeographic patterns can be outlined, with species having a Maritime Antarctic, Peninsula, and Lesser Antarctic, Circum-Antarctic, and Disjunct distribution pattern. The extent of endemism in the flora is unclear. The origin of the antarctic lichen flora appears ancient in part, although there is ample evidence for post-Pleistocene or Holocene colonization and invasion. (Auth.)

B-54659

Inoue, M., **Lichen flora and habitats of the Syowa region, continental Antarctica,** *Lichenologist,* [Dec.] 1995, 27(6), Papers presented in the Symposium "Alpine and Polar Lichenology" at the International Mycological Congress, Fifth, Vancouver, 15-16 Aug., 1994, p.451-462, 21 refs.

The lichen flora and habitats in the Showa region of continental Antarctica were surveyed. The distribution patterns of lichens appear to reflect habitat salinity, derived from wind-blown sea spray. Some halotolerant species are established in saline habitats where snow dunes are well developed. Snow and ice ameliorate the salinity of the habitat and provide a major source of moisture for lichens. Wind-borne drift snow carried by katabatic winds or occasional snow showers also provide a source of moisture to lichens growing on dry rock habitats in the Showa region. (Auth.)

B-54660

Søchting, U., Olech, M., **Lichen genus *Caloplaca* in polar regions,** *Lichenologist,* [Dec.] 1995, 27(6), Papers presented in the Symposium "Alpine and Polar Lichenology" at the International Mycological Congress, Fifth, Vancouver, 15-16 Aug., 1994, p.463-471, 16 refs.

Extensive material of *Caloplaca* from arctic and antarctic regions has been critically examined. A list of 49 species is presented for arctic regions. They are presumed to have a more or less circumpolar distribution. Twenty-two species are listed from the antarctic region, but about ten more, probably undescribed species, are present there. About one-third of the species in the Antarctic are bipolar or widespread in cold regions; these include mainly terricolous and musciolous species and none of them are maritime. It is assumed that migration of the bipolar or cosmopolitan species has taken place along the Andean mountain chain, whereas the maritime polar species have evolved separately in the two hemispheres. The *Caloplaca* species of the Antarctic are provisionally assigned to the following distribution types: continental antarctic, western antarctic, insul-antarctic and sub-antarctic. *Caloplaca exsecuta, C. saxicola* and *C. phaeocarpella* are recorded as new to the Antarctic. *Caloplaca johnstonii* (Dodge) Søchting & Olech, *comb. nov.,* is established as the correct name of *C. tenuis* Øvstedal. (Auth.)

B-54661

Smith, R.I.L., **Colonization by lichens and the development of lichen-dominated communities in the maritime Antarctic,** *Lichenologist,* [Dec.] 1995, 27(6), Papers presented in the Symposium "Alpine and Polar Lichenology" at the International Mycological Congress, Fifth, Vancouver, 15-16 Aug., 1994, p.473-483, 30 refs.

Three long-term studies of lichen growth and colonization have been undertaken at Signy I., South Orkney Is. Small individual thalli of several crustose species and uncolonized plots on 12 fresh rock surfaces were photographically monitored at intervals of 3-4 years over periods up to 20 years. The development of *Ochrolechia frigida* colonies on a regenerating moss bank, recently uncovered by a receding glacier, was similarly monitored. The results indicate that many lichens growing in sites enriched by nitrogenous compounds derived from populations of sea birds have relatively rapid colonization and growth rates. Mean percentage increase in thallus area can be as high as 15-32% per annum in some nitrophilous saxicolous species, but as low as 0.4-4% in nitrophobous species. Colonization by mixed assemblages of lichens of new rock surfaces can attain 40->90% cover after 20 years in nutrient-enriched sites, and even 20-25% in nonbiotically influenced sites. Colonization by or increase in extant *O. frigida* on the regenerating moribund moss bank was also quite rapid. It is suggested that the exceptionally large thalli of several lichen species and the locally extensive dense lichen fellfield communities in the maritime Antarctic may be much younger than previously supposed. (Auth. mod.)

B-54662

Valladares, F., Sancho, L.G., **Lichen colonization and recolonization of two recently deglaciated zones in the maritime antarctic,** *Lichenologist,* [Dec.] 1995, 27(6), Papers presented in the Symposium "Alpine and Polar Lichenology" at the International Mycological Congress, Fifth, Vancouver, 15-16 Aug., 1994, p.485-493, 19 refs.

A lichenometric study of the crustose lichen *Caloplaca sublobulata* was carried out at both Livingston and Robert Is. On the moraine of Livingston I., rock size plays an important role in lichen development, explaining most of the differences observed in the diameter of *C. sublobulata,* the number of species, and the percentage of cover among the rocks studied. On Robert I., the distance from the glacier front was associated with the lichen cover of the rocks but not with diameter of *C. sublobulata.* This homogeneous distribution of *C. sublobulata* thallus size in the Robert I. study area points to a simultaneous recolonization of the whole zone by this lichen. The lichen development on Robert I. seems to have been drastically affected by fluctuations in the persistence of snow cover following glacier front retreat. Tentative associations between ice retreat and colonization on the one hand, and changes in snow cover duration and the dynamic processes of extinction and recolonization on the other, are suggested from comparison of the two zones. (Auth.)

B-54663

Hovenden, M.J., Seppelt, R.D., **Exposure and nutrients as delimiters of lichen communities in continental Antarctica,** *Lichenologist,* [Dec.] 1995, 27(6), Papers presented in the Symposium "Alpine and Polar Lichenology" at the International Mycological Congress, Fifth, Vancouver, 15-16 Aug., 1994, p.505-516, 18 refs.

Lichens dominate the terrestrial vegetation of the ice-free regions of continental Antarctica. Vegetation patterns were studied on Windmill Is. in relation to edaphic features to elucidate the factors that govern lichen distribution and abundance. Vegetation was studied on a low rounded knoll on Clark Peninsula some 3 km northeast of the present Casey Station. Substratum nutrient levels vary considerably across the knoll due to the presence of an abandoned penguin rookery on the crest; the uneven topography provides both sheltered and exposed sites. Along a 130 m-long transect crossing the knoll from South to North, 25 species of lichen and one moss were identified. TWINSPAN analysis of species distributions identified six sociations, the distribution of which were related to substratum structure and chemistry. Several species were restricted to nutrient-rich zones while late-lying snow restricted all species in varying degrees. (Auth. mod.)

B-54665

Villafañe, V.E., Helbling, E.W., Holm-Hansen, O., Chalker, B.E., **Acclimatization of antarctic natural phytoplankton assemblages when exposed to solar ultraviolet radiation,** *Journal of plankton research,* Dec. 1995, 17(12), p.2295-2306, Refs. p.2305-2306.

The effects of solar ultraviolet radiation (UVR) on photosynthetic rates of natural assemblages of antarctic phytoplankton were determined in both 1 day and 2 week incubations during austral spring at Palmer Station. During the first day of the long-term incubations, photosynthetic rates were enhanced by ca. 40% when UV-B radiation was excluded from the culture and by an additional 80% when UV-A radiation was also excluded. In spite of this UVR-induced photoinhibition of photosynthetic rates during the first day of each long-term experiment, cultures with and without exposure to UVR both showed exponential growth after the first few days, so that at the end of the 2 week growth period the chlorophyll-*a* concentrations in the samples grown with exposure to UVR were quite similar to those in the cultures from which UVR had been excluded. Phytoplankton organic carbon concentrations increased at rates comparable to those of chlorophyll concentrations during the long-term experiments.

The effects of UVR were evident, however, from changes in the floristic and chemical composition of the phytoplankton during the long-term incubations. (Auth. mod.)

B-54666

Barthel, D., Tendal, O.S., **Antarctic Hexactinellida,** *Synopses of the antarctic benthos,* 1994, Vol.6, Theses zoologicae, Vol.23. Edited by R. Fricke, 154p., Refs. p.123-128.

DLC QL373.H6B37 1994

This volume is one of a series on antarctic benthos. It is a comprehensive source of information on the hexactinellids that inhabit the explored waters around Antarctica. The book is intended to be used by zoologists and naturalists interested in the identification of this metazoan group. The book has many taxonomic keys that address the group at all systematic levels. Figures showing the geographic distribution of the different species are incorporated. Sketch drawings of the morphological characteristics (especially spicules) of the different species are also given. A series of black and white photographs of whole specimens is presented in an appendix.

B-54667

Yang, A., Baker, B.J., Grimwade, J., Leonard, A., McClintock, J.B., **Discorhabdin alkaloids from the antarctic sponge *Latrunculia apicalis*,** *Journal of natural products,* Oct. 1995, 58(10), p.1596-1599, 15 refs.

An antarctic collection of *Latrunculia apicalis* contained as its major secondary metabolite the pigment discorhabdin C as well as a previously unreported pigment, discorhabdin G. Discorhabdin alkaloids have a variety of pharmacological and ecological bioactivities, including the mediation of interactions with the potential predator *Perknaster fuscus*, a spongivorous sea star. (Auth.)

B-54668

Simpson, R.D., Smith, S.D.A., Pople, A.R., **Effects of a spillage of diesel fuel on a rocky shore in the sub-antarctic region (Macquarie Island),** *Marine pollution bulletin,* Apr.-Dec. 1995, 31(4-12), p.367-371, 20 refs.

On Dec. 3, 1987, the supply ship *Nella Dan* ran aground at Macquarie I. releasing about 270,000 l of oil, mostly light marine diesel, into the sea. At the time of the incident, many marine invertebrates were washed up dead along 2 km of shoreline. Twelve months later, the shore community was investigated using: 1. algal and invertebrate populations of the littoral and sublittoral rocky shore, and 2. the invertebrate communities living in the holdfasts of the giant kelp *Durvillaea antarctica,* which were collected for later examination. Investigations were undertaken at both affected and control locations. Analyses of differences in community structure involved nested ANOVA and multidimensional scaling techniques. On the rocky substrate, the effect of the spill was restricted to some biota of the lower littoral and sublittoral zones—particularly echinoderms and the patellid limpet *Nacella macquariensis.* There were differences in cover for some algal species between locations. Within the kelp holdfasts, communities were dominated by peracarid crustaceans at control locations and by polychaetes (particularly the opportunistic groups—capitellids, cirratulids and spionids) at oil-affected locations. (Auth. mod.)

B-54675

Davis, L.S., Cockrem, J.F., Miller, G.D., Court, G.S., **Incubation timer for seabirds: progesterone and its relationship to hatching in Adélie penguins,** *Emu,* Dec. 1994, 95(4), p.245-251, 23 refs.

The survival of newly hatched chicks of Adélie penguins is dependent upon the foraging parent returning to the nest about the time of hatching. The authors found that both male and female Adélie penguins curtail the duration of their foraging trips if hatching is imminent, suggesting that they possess an interval timer capable of measuring the incubation period. Plasma levels of testosterone and oestradiol dropped markedly after laying in males and females, respectively, and could potentially set the timer relative to the incubation period. Progesterone levels were high in the five days before hatching in both males and females that had just returned from foraging. This suggests that a high concentration of progesterone, if not itself precipitating the return of foraging penguins, may at least be associated with whatever triggers their return. The mechanism whereby progesterone secretion increases near the end of the incubation period is unknown, but this sort of hormonally based interval timer is likely to be relevant to other seabirds where parents must complete long foraging trips before their chicks hatch. (Auth. mod.)

B-54679

Stiller, M., **Distribution and biology of the Aphroditides and Polynoids (Polychaeta) in the eastern Weddell Sea and the Lazerev Sea (Antarctica)** [Verbreitung und Lebensweise der Aphroditiden und Polynoiden (Polychaeta) im östlichen Weddellmeer und im Lazarevmeer (Antarktis)], *Berichte zur Polarforschung,* 1996, No.185, 193p., In German with English summary. Refs. p.136-146, taxonomical sketches p.147-193, and trawl data p.194-199.

General investigations on antarctic macrozoobenthos have shown that Aphroditids and Polynoids are very common polychaete families in the Weddell Sea. However, very little is known about their distribution, biology or the part they play within the benthic community of the Weddell and the Lazarev Seas. The aim of this study was to get more exact information on the horizontal and vertical distribution of these two polychaete families. Further investigations on feeding, reproduction, and growth of a high antarctic polychaetes were carried out to improve knowledge about the life cycle and life strategies of these two polychaete families. The investigated material was part of macrozoobenthos samples that were collected during seven "Polarstern" expeditions to the Weddell and Lazarev Seas. 134 trawl catches and 56 multibox corer samples taken between 118 and 4119 m have been analyzed. The main emphasis was on the continental shelf between 150 and 650 m. (Auth. mod.)

B-54680

Dahm, C., **Ecology and population dynamics of antarctic Ophiuroids (Echinodermata)** [Ökologie und Populationsdynamik antarktischer Ophiuroiden (Echinodermata)], *Berichte zur polarforschung,* 1996, No.194, 289p., In German with English summary. Refs. p.261-279.

The present study was intended to investigate the ecology and population dynamics of antarctic ophiuroids. Samples were taken on 7 Polarstern expeditions to the eastern Weddell Sea and the adjacent Lazarev Sea between 1983 and 1992. The investigation area was separated into four regions: Kapp Norvegia, Halley Bay, Filchner Rønne and Vahsel Bight and three depths <500 m, 501-1000 m, >1000 m to compare abundance, biomass, food and growth of the brittle stars. The basis of this study was the taxonomical analysis of the samples. Forty-one species belonging to 20 genera and 6 families were identified. Five of the most dominant and conspicuous species were selected for further investigations: *Astrotoma agassizii, Ophionotus victoriae, Ophiurolepis gelida, Ophiurolepis brevirima* and *Ophioceres incipiens.* (Auth. mod.)

B-54681

Berberich, D., **Planktonic foraminifer *Neogloboquadrina pachyderma* (Ehrenberg) in the Weddell Sea, Antarctica** [Die planktische Foraminifere *Neogloboquadrina pachyderma* (Ehrenberg) im Weddellmeer, Antarktis], *Berichte zur Polarforschung,* 1996, No.195, 193p., In German with English summary. Refs. p.165-177.

The distribution, seasonal development and population dynamics of *Neogloboquadrina pachyderma* (Ehrenberg) were analyzed in relation to hydrographic and sea ice regimes in the Weddell Sea, where samples were taken during six expeditions with RV *Polarstern.* Ontogenetic studies facilitate a more natural classification, taxonomy and phylogeny as well as the illumination of evolutionary lineages. Like other planktonic foraminifers, *N. pachyderma* passes through five stages during its ontogenetic development: prolocular, juvenile, neanic, adult and terminal stage. The transition from one ontogenetic stage to the next is characterized by biometric measurements and morphological changes, which were documented through scanning electron microscopy. Significant differences during these transitions are changes in the crystalline ultrastructure of the test, arrangement of chambers, formation of pores, morphology of the aperture and initiation of reproductive signs. Biometrical analyses revealed a phased pattern in successive chamber-by-chamber increases of maximum test size, resulting in allometric growth. Strong seasonal changes produce distinctive activity patterns. *N. pachyderma* overwinters in sea ice where the algae biomass is high and serves as a readily available food source. Spring and the short summer are then occupied in the reproductive processes. (Auth. mod.)

B-54682

Eastman, J.T., **Evolution of antarctic fishes: questions for consideration and avenues for research,** *Cybium,* 1995, 19(4), p.371-389, With French summary. Refs. p.385-389.

This paper is derived from the keynote address given at a workshop entitled "Technical and Theoretical Approaches to Antarctic Fish Evolution". The workshop was held in Santa Margherita Ligure, Italy from Oct. 8-10, 1994 and was sponsored by a European Science Foundation Network Proposal entitled "Fishes of the Antarctic Ocean". The paper introduces the theme of the workshop and focuses on these aspects of notothenioid evolution: the Cenozoic fossil record for fishes in Antarctica with a hypothesis for the emergence of notothenioids; the composition of the modern fauna; a comparison of the diversifications experienced by notothenioids and other teleosts, and the nature of adaptations to the antarctic marine environment. Recommended objectives for future multidisciplinary research on notothenioids are outlined. (Auth. mod.)

B-54683

Ning, X.R., Liu, Z.L., Zhu, G.H., Shi, J.X., **Size-fractionated biomass and productivity of phytoplankton and particulate organic carbon in the southern ocean,** *Polar biology,* Jan. 1996, 16(1), p.1-11, Refs. p.10-11.

During the austral summer of 1989-1990, surface samples were obtained of size-fractionated biomass and the productivity of phytoplankton, its cell abundance, the composition of the dominant species, and the concentration of particulate organic carbon (POC). The related environmental surface parameters were measured in a large-scale survey primarily of the Atlantic and Indian sectors. The results showed that the southern Atlantic sector is the most fertile, more so than the Drake Passage and the southern Indian sector. The results for size-fractionated Chl *a* showed that netplankton (>20 μm) in the South Atlantic Ocean accounted for the highest proportion (average 65%) of biomass. In the infertile Indian Ocean, picoplankton (<2 μm) accounted for the highest proportion, averaging 47%. The results for size-fractionated productivity showed that the contribution of picoplankton to total productivity was the largest in the South Atlantic Ocean and Drake Passage, those of nanoplankton (2-20 μm) and netplankton being about equal. (Auth. mod.)

B-54684

Paggi, J.C., **Feeding ecology of *Branchinecta gaini* (Crustacea: Anostraca) in ponds of South Shetland Islands, Antarctica,** *Polar biology,* Jan. 1996, 16(1), p.13-18, Refs. p.17-18.

The feeding habits and food selectivity of the crustacean *Branchinecta gaini* were studied in six ponds on King George I. *B. gaini* behaves as a detritovorous, herbivorous filter-feeder, feeding largely on organic sediments and bottom communities. The bulk of the gut contents were formed from amorphous organic material, presumably of vegetal origin, and a great variety of organisms from algae to remains of larval stages of Diptera. Filamentous algae were negatively selected but hyphae and spores, as well as remains of *B. gaini*, were positively selected. (Auth.)

B-54685

Delille, D., Mallard, L., Rosiers, C., **Inter-annual variability in marine coastal antarctic bacterioplankton,** *Polar biology,* Jan. 1996, 16(1), p.19-25, Refs. p.24-25.

The dynamics of antarctic coastal marine bacterioplankton has been studied over a 2-year period. Two field stations were sampled between one and three times a week in 1989 and 1991 in the Adélie Coast area. The survey included physicochemical (temperature and particulate organic matter) and bacteriological (total and heterotrophic counts, cell volume and frequency of dividing cells estimation) measurements. The results suggest that a strong interannual variability affects the total bacterial abundance, the mean cell volume, the percentage of free living cells and to a lesser extent, the culturable saprophytic bacterial communities. The observed variability can be partly explained by a large deficit of solar irradiance during the second year of study that may have affected sea ice and seawater primary production. (Auth.)

B-54686

Delille, D., Rosiers, C., **Seasonal changes of antarctic marine bacterioplankton and sea ice bacterial assemblages,** *Polar biology,* Jan. 1996, 16(1), p.27-34, Refs. p.32-34.

The distributions of bacterial populations in sea ice and underlying seawater were investigated on the continental shelf of the Adélie Coast area. A reference station was sampled weekly from Jan. 1991 to Jan. 1992. In winter, the survey included a minimum of six sampling layers: surface and bottom ice, brine, seawater from the interface, and at 0.5 and 2 m depth. In seawater, the total bacterial abundance ranged from 0.5×10^5 cells/ml in July to 6.0×10^5 cells/ml after ice break. Values reaching 2.5×10^6 cells/ml were recorded in the overlying ice cover. Mean cell volumes were twice as high in brine as in seawater. The saprophytic bacterial abundance ranged from 5.0×10^4 CFU (colony-forming units)/ml in some winter interface samples to less than 1.0×10^3 CFU/ml in most of the summer seawater samples. In sea ice a clear decreasing gradient for most of the studied bacterial parameters from the surface layers towards the bottom layer was found. The ice cover had a discernible impact on underlying seawater, but its influence was restricted to a limited interface layer. (Auth.)

B-54687

Dower, K.M., Lucas, M.I., Phillips, R., Dieckmann, G., Robinson, D.H., **Phytoplankton biomass, P-I relationships and primary production in the Weddell Sea, Antarctica, during the austral autumn,** *Polar biology,* Jan. 1996, 16(1), p.41-52, Refs. p.51-52.

An investigation into the changing phytoplankton biomass and total water column production during autumn sea ice formation in the eastern Weddell Sea showed reduced biomass concentrations and extremely low daily primary production. Mean chlorophyll-*a* concentration for the entire study period was extremely low. Areas of low biomass were identified as those either associated with heavy grazing or with deep mixing and corresponding low light levels. In most cases phytoplankton in the <20 μm size classes dominated. The mean index of photoadaptation, I_k, was 32.2±4.0 μmol/m^2/s and photoinhibition was found in all cases. Primary production was integrated to the critical depth (Z_{cr}) at each production station and ranged from 15.6 to 41.5 mgC/m^2/d. It appears that, other than grazing intensity, the relationship between the critical depth and the mixing depth (Z_{mix}) is an important factor as, ultimately, light availability due both to the late season and growing sea ice cover severely limits production during the austral autumn. (Auth. mod.)

B-54688

Zucconi, L., Pagano, S., Fenice, M., Selbmann, L., Tosi, S., Onofri, S., **Growth temperature preferences of fungal strains from Victoria Land, Antarctica,** *Polar biology,* Jan. 1996, 16(1), p.53-61, 32 refs.

Thirty-five strains of microfungi, isolated from various sites in Victoria Land, were grown at eight temperatures ranging from 0 to 45°C. Only 1 strain *(Chaetomium* sp. from hot soil) was a thermotolerant mesophile; other strains were psychrophilic (2 strains) or psychrotrophic (32 strains). The tolerance of different species to thermal instability is discussed, based on the width of the growth rate curves. (Auth.)

B-54689

Ichii, T., Naganobu, M., Ogishima, T., **Competition between the krill fishery and penguins in the South Shetland Islands,** *Polar biology,* Jan. 1996, 16(1), p.63-70, 38 refs.

Among the South Shetland Is., the potential competition for krill *(Euphausia superba)* between the Japanese fishery and krill-eating breeding penguins was assessed. A low level of competition was apparent due to several factors. Spatial overlap between the main fishing and foraging areas was insignificant. Firstly, the large colonies of the dominant penguin (chinstrap penguins) occurred where the sea ice disappears early in spring, and not necessarily where krill are abundant in summer, i.e. the area of krill fishery. Secondly, overlap between trawling depth and foraging dive depth of penguins was marginal, with the latter depth being shallower. Moreover, overlap in the size-frequency of krill caught by trawlers and those captured by penguins was not complete; the penguins took larger krill on average. Finally, the present small fishery is unlikely to impact upon local krill biomass in the region. (Auth. mod.)

B-54690

Kato, A., Nishiumi, I., Naito, Y., **Sexual differences in the diet of king cormorants at Macquarie Island,** *Polar biology,* Jan. 1996, 16(1), p.75-77, 13 refs.

Sexual differences in the diet of king cormorants, *Phalacrocorax albiventer,* were investigated during the 1993-1994 austral summer at Macquarie I. The major food items, identified by otoliths in regurgitations, were demersal fish; fish mass consumed could be estimated using a wet mass-otolith length relationship. Two fish species, *Paranotothenia magellanica* and *Harpagifer georgianus,* constituted 98% of the wet mass (male and female cormorants combined). Estimated individual fish mass of *P. magellanica* (19.6±11.6 g) was greater than that of *H. georgianus* (2.8±1.3 g). Total wet mass of food and number of fish in regurgitations did not differ statistically between the sexes. However, males tended to feed on larger fish than did females. (Auth.)

B-54692

Powers, L.E., Freckman, D.W., Virginia, R.A., **Depth distribution of soil nematodes in Taylor Valley, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.175-176, 10 refs.

To examine the depth distribution of nematode communities, the authors sampled sites on the north shore of Lake Hoare in Taylor Valley in austral summer 1993-1994. The sites chosen for sampling had the broad geomorphic features characteristic of the landscape of the polar deserts of Victoria Land, with distinctively patterned ground and a disturbed weathered regolith. Nematodes were present in all samples collected. Nematode populations were not related to soil moisture, which increased slightly with depth. Total numbers of nematodes were greatest at the 2.5-5.0 cm depth increment on the north shore.

B-54693

Friedmann, E.I., Druk, A.Y., McKay, C.P., **Limits of life and microbial extinction in the antarctic desert,** *Antarctic journal of the United States,* 1994, 29(5), p.176-179, 8 refs.

The authors hypothesize that a quantifiable gradient from relatively "mild" (favorable to life) to "hostile" (adverse to life) environments exists in the antarctic desert. Along this gradient, the interval between living and fossil microbial colonizations encompasses the "limit of life." Because the principal limiting environmental factor appears to be temperature, the critical threshold (point of extinction) that determines the limit of life can be defined in terms of temperature. They identified five localities in the McMurdo Dry Valleys that, on the basis of distribution of living and fossilized communities, seem to represent such a gradient. The gradient in rock temperatures is evident from the data, and it appears that the "limit of life" that separates the hostile from the life-supporting environments runs through the area of Mount Fleming, where the last representatives of living communities occur.

B-54696

Loeb, V., Siegel, V., **AMLR program: Krill stock structure and macrozooplankton abundance near Elephant Island, January to March 1994,** *Antarctic journal of the United States,* 1994, 29(5), p.185-188, 6 refs.

Net sampling operations during the Antarctic Marine Living Resources (AMLR) 1994 field season provided information on krill stock structure and the distribution and abundance of other macrozooplankton components in the Elephant I. area. Data are presented for large-area surveys and for the more restricted Elephant I. area to allow for comparisons with previous AMLR cruises. The overall krill length frequency distribution and maturity stage composition during the 1994 surveys reflect low input of individuals from the last two year classes. Salp abundance in the Elephant I. area during both 1993 and 1994 was an order of magnitude greater than during 1992.

B-54697

Holm-Hansen, O., Villafañe, V.E., Helbling, E.W., **AMLR program: Photobiological characteristics of phytoplankton around Elephant Island, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.188-190, 7 refs.

One of the major objectives in the phytoplankton component of the AMLR program was to study the photobiological characteristics of the antarctic phytoplankton and rates of primary production. Other major portions of the studies were the distribution of phytoplankton in the study area and the inorganic nutrient concentrations. This research was performed in a 91-station grid that was occupied two times, once during each leg (Leg I, Jan. 12-Feb. 9; Leg II, Feb. 14-Mar. 15).

B-54698

Villafañe, V.E., Helbling, E.W., Holm-Hansen, O., **AMLR program: Phytoplankton distribution and species composition around Elephant Island, Antarctica, January to March 1994,** *Antarctic journal of the United States,* 1994, 29(5), p.191-193, 8 refs.

As a part of the AMLR program, phytoplankton studies were carried out near Elephant I. to evaluate the biomass, species composition, and size distribution of the food reservoirs for herbivorous zooplankton, especially antarctic krill. This research was performed in a 91-station grid that was occupied two times, once during each leg (Leg I, Jan. 12-Feb. 9; Leg II, Feb. 14-Mar. 15).

B-54699

Helbling, E.W., Holm-Hansen, O., **AMLR program: Distribution of phytoplankton in the upper water column in relation to different water masses,** *Antarctic journal of the United States,* 1994, 29(5), p.193-195, 7 refs.

As part of the AMLR program, the phytoplankton project conducted intensive studies in the area around Elephant I. onboard the ship *Surveyor,* Jan. through Mar. 1994. In this paper, the authors present information on the distribution of phytoplankton with depth as related to the major water masses in the AMLR study area. Detailed biological-physical-optical data were obtained throughout the upper water column (0 to 750 m). The results obtained are consistent with other data acquired throughout the AMLR sampling grid on the distribution of phytoplankton as determined by microscopic methods and on rates of primary production as estimated by radiocarbon techniques.

B-54701

Reitsch, G.A., Veit, R.R., **AMLR program: Abundance of vertebrate predators and their spatial association with krill,** *Antarctic journal of the United States,* 1994, 29(5), p.198-200, 5 refs.

The objectives during AMLR 1994 were the following: to determine a relative abundance and distribution of seabirds and marine mammals in the survey areas and to determine the spatial scale of association between krill and its predators. In addition, the authors made identification photographs of humpback whales *(Megaptera novaeangliae),* which will be added to the Antarctic Humpback Whale Log housed at Allied Whale. These photographs will eventually enable population estimates and patterns of habitat use to be made within the Antarctic and elsewhere.

B-54702

Bengtson, J.L., et al, **AMLR program: Pinniped and seabird studies at Seal Island, South Shetland Islands, during the 1993-1994 austral summer,** *Antarctic journal of the United States,* 1994, 29(5), p.200-201.

The underlying objectives of the research reported here are to determine what factors are primarily responsible for influencing the population dynamics of antarctic pinnipeds and seabirds, to detect significant changes in key components of the southern ocean ecosystem, and to distinguish between changes due to commercial fisheries and those due to natural causes. An important aspect of this work is focused on understanding the relationships among land-breeding seabirds and pinnipeds, their prey, and environmental conditions.

B-54705

Sullivan, B., Matlick, H.A., Prézelin, B.B., **Palmer LTER: Patterns of distribution of inorganic macronutrients, phytoplankton pigmentation, and photosynthetic activity in an ice-dominated ecosystem in austral winter 1993,** *Antarctic journal of the United States,* 1994, 29(5), p.207-209, 4 refs.

In Aug. and Sep. 1993 the authors resolved the mesoscale variability in phytoplankton pigmentation, nutrition, and photosynthetic activity in waters west of the Palmer Peninsula. Pigmentation was very dilute in the late winter period. Maximum chlorophyll-*a* biomass was approximately

250 ng/L, or about one-fourth that measured for the same region the previous austral fall (Mar. and Apr. 1993) and about one-half that measured in the austral spring (Nov.) of 1991 when the region was also heavily ice-covered. Chlorophyll was most abundant at either end of the transect, with highest concentrations and co-occurrence of all chemotaxonomic pigments occurring at the southernmost end of the grid.

B-54706

Maranger, R., Bird, D.F., Karl, D.M., **Palmer LTER: Spatial distribution of viruses in the Palmer LTER region,** *Antarctic journal of the United States,* 1994, 29(5), p.209-211, 14 refs.

During cruise 94-01 of the R/V *Polar Duke* (Jan. 1994), the authors enumerated viruses from surface water samples taken at each station of the Palmer Long-Term Ecosystem Research (LTER) transect lines 300, 400, 500, and 600. Viral abundances ranged from 3.2×10^5 to 1.7×10^6 viruses/mL (coefficient of variation of each mean was approximately 30%) in the surface waters of the region studied. Peaks of viral abundances appeared at stations 40 (nearest to shore), 100, and 120 whereas the lowest abundances observed were at stations 60 and 180.

B-54707

Christian, J.R., Karl, D.M., **Palmer LTER: Relative activities of several bacterial exoenzymes in the western Antarctic Peninsula during austral summer: Evidence of sea-ice influence on pelagic bacterial communities,** *Antarctic journal of the United States,* 1994, 29(5), p.212-214, 7 refs.

In mid-to-late austral summer (Jan. 6 to Feb. 12) 1994 aboard the R/V *Polar Duke*, the authors surveyed the region south and west of Palmer Station along the 300, 400, 500, and 600 lines of the LTER sampling grid. Activities of the bacterial exoenzymes leucine aminopeptidase (LAPase), α-glucosidase (AGase), and β-glucosidase (BGase) were determined at most stations. The relative activities of these three enzymes expressed by bacterioplankton on this cruise suggest that the bacterial community goes through several as yet poorly defined stages of succession as the annual pack ice recedes.

B-54708

Schofield, O., Prézelin, B.B., Moline, M.A., **Palmer LTER: Photoadaptation in a coastal phytoplankton bloom and impact on the radiation utilization efficiency for carbon fixation,** *Antarctic journal of the United States,* 1994, 29(5), p.214-216, 6 refs.

As part of the LTER program, the temporal dynamics of a phytoplankton bloom were documented near Palmer Station during the summer of 1991-1992. The ability to follow the formation of this bloom over time can provide insight into the photoadaptational capabilities of the phytoplankton and the corresponding impact on water column optical properties. This preliminary analysis provides strong evidence that once phytoplankton are given a stable light environment, algae quickly photoacclimate over a timescale of a few days.

B-54709

Moline, M.A., Prézelin, B.B., **Palmer LTER: Impact of a large diatom bloom on macronutrient distribution in Arthur Harbor during austral summer 1991-1992,** *Antarctic journal of the United States,* 1994, 29(5), p.217-219, 10 refs.

A set of stations within 3.2 km of Palmer Station was established as part of the Palmer LTER program. The subset of Palmer 1991-1992 data from station B illustrates the timing and magnitude of formation and dissipation of a large summer diatom bloom, which occurred during the second week of Dec. 1991, and the significant impact that bloom had on inorganic nutrient availability within the water column. Over the duration of the bloom, chl-*a* concentrations changed by three orders of magnitude [0.3-30 mg of chl-*a*/m^3]. Biomass slowly declined during the first 2 weeks of Jan. 1992. Temperature and salinity data suggest a well-mixed, low-chl-*a* biomass water mass advected into the area during the second week of Jan. 1992, apparently replacing the biomass-rich stratified water mass.

B-54716

Dana, G.L., Tate, C.M., Dewey, S.L., **McMurdo LTER: Using narrow band spectroradiometry to assess algal and moss communities in a dry valley stream,** *Antarctic journal of the United States,* 1994, 29(5), p.232-234, 5 refs.

An objective of the LTER project in the McMurdo Dry Valleys is to understand processes regulating productivity, biomass, and distribution of the stream communities using a combination of long-term monitoring, *in situ* experiments, and modeling. Spectroradiometry may be useful in accomplishing several LTER goals, including assessing distribution, biomass, and nutrient status of the stream communities. The ability of a plant to reflect or absorb light is dependent on its morphological and chemical characteristics, which in turn are a function of plant development, health, and growing conditions. The relation between spectral reflectivity and plant status makes spectroradiometry a potential tool for studying ecological features of plant populations. In this article, the authors describe the use of close-range remote-sensing techniques for assessing algal and moss communities of the streams within the McMurdo Dry Valleys.

B-54719

Priscu, J.C., **McMurdo LTER: Phytoplankton nutrient deficiency in lakes of the Taylor Valley, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.239-241, 10 refs.

This article presents results from experimental nutrient (nitrogen and phosphorus) bioassays conducted on Lakes Bonney (east and west lobes), Hoare, Fryxell, and Vanda. All experiments were conducted at the Lake Bonney field camp during Nov. and Dec. 1993. Photosynthesis in all phytoplankton populations sampled from Lake Bonney was stimulated strongly, relative to the nonamended controls, by phosphorus enrichment alone. Simultaneous addition of phosphorus and nitrogen also resulted in the greatest increase in photosynthesis in Lakes Hoare and Fryxell. Bioassay results from Lake Vanda show that nutrient additions actually lowered photosynthetic activity relative to the control. The time-course profile also shows no net photosynthetic activity in the sample from the time of the first measurement (24 hours) up to 120 hours.

B-54720

Moorhead, D.L., Wharton, R.A., Jr., **McMurdo LTER: Primary production model of benthic microbial mats in Lake Hoare, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.241-243, 11 refs.

Primary production of benthic mats is being investigated as an initial step in elucidating sources of organic matter and patterns of productivity in the Taylor Valley landscape. A mathematical model was developed to examine the productivity patterns of benthic microbial mats in Lake Hoare. Simulations were conducted over the 365-day interval for which sunlight data were available. Estimates of total annual net production varied from a maximum of 155 g C/m^2 at just beneath the lake ice, to about 0.72 g C/m^2 at a depth of about 15 m. These values lie within reported levels of net annual production of benthic microbial communities in other antarctic streams and lakes at similar depths.

B-54725

Lizotte, M.P., Sharp, T.R., Priscu, J.C., **Phytoplankton dynamics in the stratified water column of Lake Bonney, Antarctica. 1. Biomass and productivity during the winter-spring transition,** *Polar biology,* Mar. 1996, 16(3), p.155-162, 26 refs.

Phytoplankton biomass and photosynthesis were measured in the east lobe of Lake Bonney during the winter-spring transition (Sep.) to mid-summer (Jan.) Results indicate that phytoplankton photosynthesis began in late winter (before Sep. 9, the earliest sampling date); maxima for phytoplankton biomass and production developed sequentially in time from the top to the bottom of the trophogenic zone, following the seasonal increase in irradiance; and the highest photosynthetic efficiencies occurred in early spring, then decreased over the remainder of the phytoplankton growth season. The spring decrease in photosynthetic rates for shallower phytoplankton appeared to be related to nutrient availability, while photosynthesis in the deeper populations was solely light-dependent. (Auth. mod.)

B-54726

Kito, K., Shishida, Y., Ohyama, Y., **New species of the genus *Eudorylaimus* Andrássy, 1959 (Nematoda: Qudsianematidae) from East Antarctica,** *Polar biology,* Mar. 1996, 16(3), p.163-169, Refs. p.168-169.

Eudorylaimus shirasei sp. nov. is described as the seventh member of the genus in the antarctic region. The specimens were found among green algae collected near the Molodezhnaya Station and in moss from Cape Ryùgù on the Prince Olav Coast. This species resembles *E. similis* (de Man, 1876), *E. coniceps* Loof, 1975 and *E. imitatoris* Gagarin, 1982, but differs from them in the shape of the tail and some other characteristics on the lip region, odontostyle, spicules and precloacal supplements. It is also similar to three species known from females, *E. eremitus* (Thorne, 1939), *E. jurassicus* (Altherr, 1953) and *E. altherri* Tjepkema et al., 1971, but differs in the features of the body length, lip region, amphids, odontostyle and vulva. The present species has multinucleate intestinal cells, which have not been so far reported in *Eudorylaimus.* (Auth.)

B-54727

Chown, S.L., **Kelp degradation by *Paractora trichosterna* (Thomson) (Diptera: Helcomyzidae) at sub-Antarctic South Georgia,** *Polar biology,* Mar. 1996, 16(3), p.171-178, Refs. p.177-178.

The life-cycle of *Paractora trichosterna* and its contribution to kelp degradation at Husvik Harbour, South Georgia were investigated in the laboratory and in two artificial wrack beds in the field. Duration of the larval stage was approximately 2 months at 10°C, during which time larvae attained a maximum individual mass of ca. 90 mg. Larvae had a relative consumption rate of 0.734 mg dry mass kelp/mg dry mass larva/day. Based on this rate and information on larval densities of *P. trichosterna,* and a smaller species, *Antrops truncipennis,* kelp consumption was estimated to be 714-870 g dry mass kelp/m^2 over the 7-week study period. During this time, kelp dry biomass declined to 30% of its original value. *P. trichosterna* was directly responsible for 12% of this loss in the protected bed and 20% in the exposed area. *A. truncipennis* was responsible for an additional 3% loss in the exposed bed and 8% in the protected area. Differences in biomass of the larvae and adults of the two species between the beds suggested that *P. trichosterna* prefers the exposed wrack more than does *A. truncipennis.* (Auth. mod.)

B-54728

Sohlenius, B., Boström, S., Hirschfelder, A., **Distribution patterns of microfauna (nematodes, rotifers and tardigrades) on nunataks in Dronning Maud Land, East Antarctica,** *Polar biology,* Mar. 1996, 16(3), p.191-200, 23 refs.

In a previous paper the occurrence of nematodes, rotifers and tardigrades in 29 samples from nunataks in Queen Maud Land taken in 1991-1992 was recorded. In this study, a more thorough description of animal distribution was possible by adding 64 new soil samples (1993-1994) from 11 nunataks. The number of species recorded from the area has now increased from 27 to 34. The populations were patchily distributed and the species composition differed between nunatak areas. Rotifers occurred in most of the samples (76%) with a maximum density of 750 specimens/gram dry weight. The nematode distribution was more restricted. Nematodes were found in high abundance on only four of the nunataks and occurred in 35% of the samples with a maximum density of 210 specimens/gram dry weight. Tardigrades were found in 39% of the samples with a maximum density of 580 specimens/gram dry weight. The distribution pattern of the fauna on two of the nunataks was studied in greater detail; the results showed little difference in peak abundance and species composition between samplings carried out during two southern summer seasons. (Auth. mod.)

B-54729

Davis, L.S., Boersma, P.D., Court, G.S., **Satellite telemetry of the winter migration of Adélie penguins (*Pygoscelis adeliae*),** *Polar biology,* Mar. 1996, 16(3), p.221-225, 24 refs.

Adélie penguins, after breeding in Antarctica during the austral summer, undergo a winter migration before returning to the breeding ground 8 months later. It is the major source of adult mortality, with about a quarter of them not returning. Here the authors describe the first attempt to track the winter migration of Adélie penguins using satellite telemetry. Transmitters were attached to two penguins on Feb. 16, 1991 after their post-breeding moult at Cape Bird, Ross I. Transmissions were received from one penguin (bird #1) for 4.4 months, during which time it traveled 2792.6 km from the rookery. Transmissions were received from the other penguin (bird #2) for 2.5 months during which time it followed a path remarkably similar to that of bird #1. The penguins travelled northwards up the coast of Victoria Land, and were midway between the Balleny Is. and the antarctic coast on May 3. Thereafter, the record from bird #1 shows that it travelled further westwards until it turned due north and moved away from the coast. By June 29, when transmissions ended, its progress had slowed and it was northwest of the Balleny Is. Two novel points that arise from this study are that Adélie penguins from Cape Bird undergo winter migrations of not less than 5000 km, and that they may be travelling to common overwinter feeding grounds. (Auth. mod.)

B-54730

Jackson, G.D., McKinnon, J.F., **Beak length analysis of arrow squid *Nototodarus sloanii* (Cephalopoda: Ommastrephidae) in southern New Zealand waters,** *Polar biology,* Mar. 1996, 16(3), p.227-230, Refs. p.229-230.

Beak length analysis was undertaken for the arrow squid *Nototodarus sloanii* in the southern ocean between Stewart and Auckland Is. *N. sloanii* has a restricted range and is endemic to the waters around New Zealand and its associated southern islands, where it supports a fishery and is preyed upon by a number of fishes, marine mammals and birds. Lower rostral length (LRL) and upper rostral length (URL) were analyzed to see how these beak measurements related to both mantle length (ML) and wet weight (W). Both lower and upper rostral lengths could be used as useful predictors of ML and W in *N. sloanii,* as relationships had limited scatter and high correlation coefficients. The relationships between LRL and ML, and URL and ML were only linear after regressing log-transformed values of beak length against ML. However, the relationships between LRL and W, and URL and W were linear without transforming either the *x* or *y* values. (Auth. mod.)

B-54732

SCAR Group of Specialists on Seals, **Report of the Workshop on Southern Elephant Seals,** [1991], 14p. + appendices, SCAR Group of Specialists on Seals Workshop, Monterey Bay Aquarium, Monterey, CA, May 22-23, 1991. Report.

The SCAR Group of Specialists on Seals convened a workshop to consider issues related to the declining populations of southern elephant seals and to develop recommendations for future action. The workshop's terms of reference were to: review the current status of stocks of southern elephant seals; review information about age structure, survivorship, reproductive rate, and nutrition in relation to recent changes in the status of stocks; assess the potential causes of past and present trends in the size of stocks with an emphasis on the role of elephant seals as top predators in the ecosystem and their potential interactions with commercial fisheries; recommend actions to increase the quantity and comparability of data about trends in stocks or indicators of the nutritional status of stocks; consider the practicality of long-term monitoring of elephant seal populations; and identify and recommend areas of research which will add significantly to the process of stock assessment.

B-54736

Crockett, A.B., **FY-1994 environmental sampling and analysis plan for Winter Quarters Bay, and other activities, McMurdo Station, Antarctica,** U.S. Department of Energy and U.S. National Science Foundation. Interagency Agreement No. DPP-9102787, Washington, Nov. 1993, 12p. + appendices, Unpublished manuscript. 8 refs.

FY-1994 environmental monitoring plans are directly related to the marine environment at McMurdo Station. This document describes the environmental sampling and analysis plans for three different efforts, including mapping contamination and toxicity in Winter Quarters Bay sediments, conducting a dye study to aid in the selection of a possible new location for the wastewater outfall, and evaluation of a proposed technique for collecting volatile organic compounds from the wastewater outfall using a modified commercial sampler.

B-54741

Beliaev, A.S., Chernykh, N.A., Gal'chenko, V.F., Ivanov, M.V., **Detection of methylotrophs in natural samples by amplification of a fragment of the *moxF* gene,** *Microbiology,* Nov.-Dec. 1995, 64(6), p.667-669, Translated from Mikrobiologiia. 18 refs.

A method for detecting methylotrophic microorganisms with the help of the polymerase chain reaction was developed. Two primers were synthesized, designed on the basis of comparing conserved sequences of the genes encoding the large subunit of methanol dehydrogenase. The developed system was tested with six strains of methylotrophic bacteria and with natural samples collected in the Bunger Hills. The results suggest the possibility of applying the developed method for qualitative detection of methylotrophs in natural samples. (Auth.)

B-54742

Chernykh, N.A., **Detection of the ribulose bisphosphate carboxylase gene in natural samples by polymerase chain reaction,** *Microbiology,* Nov.-Dec. 1995, 64(6), p.670-673, Translated from Mikrobiologiia. 17 refs.

A method was developed to allow detection of the *rbcL* gene in natural samples. The method is based on polymerase chain reaction (PCR) in the presence of oligonucleotide primers complementary to the conserved fragments of the *rbcL* gene from oxy- and anoxygenic phototrophic bacteria and some chemoautotrophic bacteria. Use of this method made it possible to detect the *rbcL* gene in samples of natural water and sediments from the Bunger Hills lakes and in samples of antarctic soil. A correlation was revealed between the results obtained by the PCR-based method and the data on the incorporation of $^{14}CO_2$ via ribulose bisphosphate carboxylase in natural samples. (Auth.)

B-54753

Convey, P., **Influence of environmental characteristics on life history attributes of antarctic terrestrial biota,** *Cambridge Philosophical Society. Biological reviews,* May 1996, 71(2), p.191-225, Refs. p.216-225.

After an extensive review of the literature, and comparisons of life history traits of antarctic terrestrial micro-arthropods and bryophytes in relation to temperate species, the author presents the following conclusions: as a result of the combination of primitive features and advanced adaptations, polar terrestrial plants and animals have very flexible life histories. Survival of long periods of predictable or unpredictable adverse environmental conditions is possible and growth and reproduction can occur whenever the opportunity presents itself, whilst seasons of poor growth or failed reproduction can be absorbed with relatively little loss to the individual. Such flexibility may be related to the lack of competition in polar environments, and is probably not available in the more structured and seasonally synchronized life histories of many temperate representatives of these groups. Although the correlates of A-/S-selection (adversity or stress) provide a good description of life histories seen in antarctic species, they give little new information on their adaptive features or evolutionary history.

B-54754

Bustos, R.O., Romo, C.R., Healy, M.G., **Stabilisation of trypsin-like enzymes from antarctic krill: effect of polyols, polysaccharides and proteins,** *Journal of chemical technology and biotechnology,* Feb. 1996, 65(2), p.193-199, 36 refs.

The stabilization of trypsin-like enzyme purified from krill-processing wastewater was studied using different proteins, polyols and polysaccharides. The effect of the different stabilizers was evaluated both in solution and in dry samples of the enzymes. The best result was obtained in a 50% (w/v) sorbitol solution where a 12-fold half-life increase was achieved. Different mechanisms of stabilization were observed for these two groups of substances. In 50% (w/w) dry enzyme/stabilizer mixtures, the increase in half-life of krill trypsin-like enzymes was: maltodextrins>sucrose>sorbitol>mannitol>xylitol. Dry samples were also prepared by coprecipitation of the enzyme/stabilizer mixture with 95% ethanol, followed by oven drying of the coprecipitates. Under these conditions, the modified maltodextrin PSM 10 (Reppe-Glykos AB, Sweden) gave the best results with a 25-fold half-life increase. The relevance of this result to the industrial application of krill trypsin-like enzymes is discussed. (Auth. mod.)

B-54755

Little, G.J., **Body temperature in the newborn southern elephant seal, *Mirounga leonina*, at Macquarie Island,** *Marine mammal science,* Oct. 1995, 11(4), p.480-490, 40 refs.

Newborn southern elephant seal pups were reported by Laws (1953) to be "to some extent poikilothermic at birth." Rectal temperatures of known age southern elephant seal pups were recorded during the 1985 pupping season at Macquarie I. The mean pup rectal temperature was 38.1°C, n=131, range=36.5°-39.1°C. Pups at two hours, six hours, and one day after birth had significantly higher rectal temperatures than pups two, three, and four days of age. Rectal temperatures of neonatal southern elephant seals were within the range observed for other pinnipeds, but never as low as the 31°C previously observed for southern elephant seals at Signy I. in 1953. A significant though weak positive correlation was found between pup temperature and body weight. However, no correlation between pup temperature and age or any environmental factor was found. These observations demonstrated that southern elephant seal pups at Macquarie I. are homeothermic rather than heterothermic from birth. (Auth. mod.)

B-54756

Slip, D.J., Moore, G.J., Green, K., **Stomach contents of a southern bottlenose whale, *Hyperoodon planifrons*, stranded at Heard Island,** *Marine mammal science,* Oct. 1995, 11(4), p.575-584, 30 refs.

In this study the stomach contents of a southern bottlenose whale which stranded *post mortem* at Heard I. were examined in detail. The whale was a 6.30 m female which had died and was washed ashore at Heard I. on Nov. 25, 1992. Very little post-mortem decay had occurred which suggested the animal had died quite recently, but the cause of death could not be determined. Stomach contents were removed, stored in ethanol, and returned to Australia for identification. Cephalopod beaks were identified following Clarke (1986*b*). Lower beaks were identified by comparison with a reference collection compiled by M. Clarke and K. Green and held at the Australian Antarctic Division. Lower rostral lengths (LRL) were measured to the nearest 0.1 mm using vernier calipers. Allometric regression equations were used to estimate whole wet body mass and dorsal mantle length (DML) from LRL. Fish otoliths were identified by comparison with those in an otolith reference collection held at the Australian Antarctic Division and by following Williams and McEldowney (1990). 3,025 lower beaks were recovered from the whale's stomach, including three buccal masses with flesh attached. Ten of these beaks could not be identified due to digestive erosion. Fifteen species of squid from nine families were identified, and all species were oceanic. This represented an estimated 481.6 kg wet weight of cephalopods. In addition, 238 eye lenses were recovered. (Auth. mod.)

B-54763

Scientific Committee on Antarctic Research, **SCAR report No.10, Dec. 1994. Coastal and shelf ecology of the antarctic sea-ice zone. Science Plan and Implementation Plan, October 1994,** Cambridge, Scott Polar Research Institute, 1994, 20p.

This document describes the Science Plan for CS-EASIZ (Coastal and Shelf Ecology of the Antarctic Sea-Ice Zone). The aim of the CS-EASIZ Program is to improve the understanding of the structure and dynamics of the antarctic coastal and shelf ecosystem (ACSE). Particular attention will be paid to those features that make the biology of this ice-dominated ecosystem so distinctive, and to understanding seasonal, interannual and long-term changes. Six key scientific questions have been identified, and for each of these between two and seven research areas are recommended. The heart of the CS-EASIZ Program will be the Core Program, a series of basic measurements to be undertaken on the ice, water-column and benthic sub-systems of the ACSE. It is proposed that CS-EASIZ start in the 1994-95 season and run for 10 years. A dedicated cruise has been scheduled for the 1996-97 season, and a timetable of workshops and symposia is proposed. (Auth. mod.)

B-54773

Cattaneo-Vietti, R., Gambi, M.C., **Ecological studies on benthos at Terra Nova Bay (Ross Sea): an overview of the Italian Antarctic Research Programme (1987/92),** *Ambiente Antartide,* Dec. 1995, No.6, p.18-23, Refs. p.22-23.

An overview of the ecological benthic studies carried out at Terra Nova Bay in the framework of the Italian Antarctic Research Programme (PNRA) is presented. The main research topics on benthos include taxonomy, floristic, faunistic and biogeography of single taxon, benthic communities distribution and structure, structural, functional and autoecological studies, and the role of benthic organisms in a larger ecological context. For each of these topics, a short description of the main results obtained as well as a list of the published papers are given. (Auth.)

B-54779
Di Prisco, G., **European Science Foundation Network "Fishes of the Antarctic Ocean",** *Ambiente Antartide,* Dec. 1995, No.6, p.44-50.

The Network Committee of the European Science Foundation in Oct. and the Executive Council in Nov., 1993 approved the proposal of a 3-year network, "Fishes of the Antarctic Continent." The scope of the network is to achieve coordination amongst all European countries promoting research on fishes of the antarctic seas. A somewhat shortened version of the proposal approved by ESF for 1994-97 and illustrating the aims and structure of the network is herewith brought to the attention of the scientific community, and in particular of scientists studying the biology of antarctic fishes. The first Meeting of the Coordination Committee took place in Paris in Dec. 1994. The first yearly Workshop (Technical and Theoretical Approaches to Antarctic Fish Evolution) was held in Santa Margherita Ligure (Genova), Italy, on Oct. 8-10, 1994. The second Workshop will be in Liège, Belgium, in Sep. 1995.

B-54780
Clarke, A., Di Prisco, G., Pisano, E., **Report of the workshop "Technical and theoretical approaches to Antarctic fish evolution",** *Ambiente Antartide,* Dec. 1995, No.6, p.50-53.

The European Science Foundation Network on "Fishes of the Antarctic Ocean" held its first workshop in Santa Margherita Ligure, Genova, Italy, on Oct. 8-10, 1994. The main section of the workshop consisted of a series of five round-table discussions. Each discussion was centered on a specific theme, was introduced by a co-ordinator, and involved all participants. The five themes, reviewed here, were: the traditional approach to the evolution of antarctic fishes; the molecular approach, cytogenetics; physiological evolution; and ecology.

B-54784
Becker, K., Wöhrmann, A.P.A., Rahmann, H., **Brain gangliosides and cold-adaptation in high-antarctic fish,** *Biochemical systematics and ecology,* Nov./Dec. 1995, 23(7/8), p.695-707, 65 refs.

The concentration and composition of gangliosides from the brain of eight species of antarctic Notothenioid fishes belonging to the class of perciformes and two species of boreal fishes were investigated. The concentration of whole brain gangliosides in Notothenioid fishes was slightly lower than that in the brains of fish species which live in warm, temperate habitats. The composition of brain gangliosides was completely different from that of warm adapted fish species. The relative concentration of polysialogangliosides, GT1b-GH is strongly increased in all the investigated antarctic species. They have the most complex and most polar brain ganglioside pattern among the teleosts. This may be one of the mechanisms, beside antifreeze proteins, to keep the neuronal membranes functional even below the freezing point. (Auth. mod.)

B-54785
Körtje, K.H., Aich, B., Lips, K., Rahmann, H., **Cellular substructures in the optic tectum of antarctic and temperate fish,** *Journal of zoology,* Feb. 1996, 238(2), p.333-350, 30 refs.

The brain of antarctic fish of the perciform suborder Notothenioidea was analyzed with light- and electronmicroscopical methods. The overall organization and ultrastructure of the optic tectum is very similar to that of fish from temperate climates. However, unusual structures were observed in neurons and glial cells, sometimes in high frequencies. These structures are sometimes connected to neuronal processes, so that they seem to originate by a sort of budding process, but most of them are isolated, as can be concluded from thick sections of up to 800 nm thickness. These unusual objects are present in high abundance in members of the white-blooded antarctic fish family Channichthyidae. These so-called icefish lack haemoglobin and exhibit the highest degree of cold adaptation. The red-blooded notothenoid fish had smaller amounts of these structures and they were observed even in fish from temperate climates. In fish from temperate climates the unusual substructures were more abundant during adaptation to cold water temperatures than to warm conditions. Therefore, the findings may indicate a general phenomenon of cold adaptation with unusual interactions of neurons and glial cells, but the precise function is not yet understood. (Auth. mod.)

B-54788
Nichols, D.S., Nichols, P.D., McMeekin, T.A., **Ecology and physiology of psychrophilic bacteria from antarctic saline lakes and sea-ice,** *Science progress,* 1995, 78(pt.4), p.311-347, Refs. p. 340-347.

The evolution of psychrophilic prokaryotes, those bacteria that require low temperature for survival and growth, has paralleled the formation of 'permanently' cold environments on earth. The sea-ice that annually forms and melts around the antarctic continent, and the marine-derived saline lakes of the Vestfold Hills in East Antarctica, are examples of two unique habitats for psychrophilic organisms. In both environments, microbial growth is governed by the twin constraints of temperature and the availability of free water (water activity). In sea-ice, psychrophilic bacteria dominate the culturable microbial community. In the diversity of saline lake systems, their dominance, and very survival, depend on the individual characteristics of each lake. This review discusses the formation of these uniquely harsh environments, considers the ultimate physicochemical factors controlling the lower temperature limits of prokaryotic life, and reviews the basis of one of the major physiological adaptations necessary for psychrophilic growth, the lipids of the cell membrane. (Auth.)

B-54789
Block, W., **Insects and freezing,** *Science progress,* 1995, 78(pt.4), p.349-372, 57 refs.

Some insects freeze, others do not; some insects die when frozen, others do not. For cold-hardy species, there are two main options, freeze avoidance and freeze tolerance. The former involves the ability to supercool by elimination or masking of potential ice nucleators, polyols to depress the freezing point of the body fluids and other physiological mechanisms to avoid ice nucleation and the formation of lethal ice. Freeze tolerance employs proteinaceous ice nucleators to promote extracellular freezing, polyols for cryoprotection and the survival of partial ice formation. Freeze avoidance is common in insects whilst freeze tolerance occurs less frequently. The role of water in the low temperature physiology of insects is paramount and a greater understanding of its activity in insects (and other biological systems) is required before full understanding of the physiological and biochemical mechanisms underlying insect cold tolerance can be achieved. Research in insect cryobiology has application in the control of insect pests, in the use of ice nucleating microorganisms for biological control and in the development of techniques for the low temperature preservation of a range of biological materials, tissues and cells. (Auth. mod.)

B-54805
Berntsen, T., **Sustainable management of the polar regions,** World Wilderness Congress, 5th, Tromsø, Norway, Sep. 1993: Arctic wilderness, edited by V.G. Martin and N. Tyler, Golden, CO, North American Press, 1995, p.195-200.

DLC QH77.A68W67 1993

Polar ecosystems are specially adapted to the extremes of temperature and climate found in the Arctic and Antarctic. The ecological integrity of these polar regions is threatened by local human activities and by the long-range transport of pollutants from other areas of the planet. Policy makers must actively seek to safeguard these fragile ecosystems for future generations and to ensure that natural resources in the areas are exploited in a sustainable manner. Since polar ecosystems are extremely fragile and recover only slowly from damages, human activities in these regions must be planned effectively. The Antarctic Treaty of 1959 initiated the development of protections for polar regions. Pollutant migration data gathered by the Arctic Monitoring and Assessment Program are reviewed. (Auth. mod.)

B-54808
Zamon, J.E., Greene, C.H., Meir, E., Demer, D.A., Hewitt, R.P., Sexton, S., **Acoustic characterization of the three-dimensional prey field of foraging chinstrap penguins,** *Marine ecology progress series,* Feb. 8, 1996, 131(1-3), p.1-10, 43 refs.

Few studies of diving predators have explicitly addressed the 3-dimensional nature of interactions between predators and prey at the spatial and temporal scales relevant to an individual predator's search behavior. The authors present a new method for examining such interactions using the results from an acoustic survey of krill availability to foraging penguins. Analyses of fine-scale krill distributions within a 1852 x 1852 x 50 m volume of ocean revealed substantial prey patchiness in all dimensions. The survey detected the presence of at least 6 krill aggregations in the survey area. The surface distribution of penguins was associated with the edges of these aggregations and was nonrandomly associated with krill densities above 0.1 krill/m^3 in the 30 to 40 m depth layer. The latter association was masked when krill abundance was integrated over the entire water column. Given that mean daytime dive depths for chinstrap penguins fall between 30 and 40 m, these data suggest penguins may fail to detect or choose to pass by shallow, denser prey aggregations and successfully forage on deeper, more homogeneously distributed krill offering higher encounter probabilities per unit volume searched. These findings reveal biologically important features of prey patchiness that cannot be addressed within the limitations of a primarily 2-dimensional analysis of predator-prey distributions. (Auth. mod.)

B-54809
Kaufmann, R.S., Smith, K.L., Jr., Baldwin, R.J., Glatts, R.C., Robison, B.H., Reisenbichler, K.R., **Effects of seasonal pack ice on the distribution of macrozooplankton and micronekton in the northwestern Weddell Sea,** *Marine biology,* Dec. 1995, 124(3), p.387-397, 51 refs.

Bottom-moored free-vehicle acoustic instruments were used in concert with midwater trawls and baited traps to examine the abundance, size distribution and vertical distribution of pelagic organisms in the uppermost 100 m of the water column during the austral spring of 1992 in two areas of the northwestern Weddell Sea, one covered by seasonal pack ice and the other free of ice cover. Acoustic targets were more abundant and significantly larger at the open-water station than beneath pack ice. However, targets at the ice-covered site exhibited a pronounced diel pattern, with the largest targets detected only at night. Samples from night trawls at the ice-covered site contained several species of large, vertically-migrating mesopelagic fishes, whereas these species were absent from trawls taken during the day. In addition, baited traps deployed in pack ice just beneath the ice-water interface collected large numbers of scavenging lysianassoid amphipods, while deeper traps beneath the ice and traps at the open-water station were empty, indicating the presence of a scavenging community associated with the undersurface of the ice. These results support the idea that mesopelagic organisms migrate closer to the surface beneath pack ice than in open water, where they risk predation by seabirds. (Auth.)

B-54816
Arnould, J.P.Y., Croxall, J.P., **Trends in entanglement of antarctic fur seals (*Arctocephalus gazella*) in man-made debris at South Georgia,** *Marine pollution bulletin,* Nov. 1995, 30(11), p.707-712, 20 refs.

A study conducted at South Georgia in 1988-89 indicated that several thousand antarctic fur seals were entangled mainly in man-made material originating from fishing vessels. Five subsequent years of recording entangled fur seals confirms that entanglement is a persistent problem, although its incidence has been halved in recent years. However, the South Georgia fur seal population has approximately doubled in the same period, so that the overall total of animals entangled may even have increased. Nevertheless, because most seals entangled are juvenile males, the current rate of entanglement will have negligible effects on the reproductive rate of the South Georgia population, especially in relation to its current rate of population increase. The reduction in observed entanglement incidence cannot be attributed mainly to improved waste disposal practices because it has coincided with substantial reductions in fishing activity around South Georgia. However, the particular reduction in entanglement caused by packing bands, and the fact that all such bands washed ashore over the last 2 years have been cut, does suggest a general improvement in standards of waste disposal on southern ocean fishing vessels. (Auth. mod.)

B-54817
Davenport, J., Wilson, P.C., **Mobility, gregariousness and attachment in four small bivalve mollusc species at Husvik, South Georgia,** *Journal of molluscan studies,* Nov. 1995, 61(4), p.491-498, 5 refs.

A study is presented describing the life style of these nearly microscopic molluscs around South Georgia. Several enlarged photographs give a perspective of size and views of how these tiny life forms survive in a generally hostile environment, in which they literally hang on by a thread.

B-54829
Jones, V.J., Juggins, S., **Construction of a diatom-based chlorophyll *a* transfer function and its application at three lakes on Signy Island (maritime Antarctic) subject to differing degrees of nutrient enrichment,** *Freshwater biology,* Dec. 1995, 34(3), p.433-445, Refs. p.443-445.

Canonical correspondence analysis of a diatom and water chemistry dataset from 59 maritime antarctic lakes situated on Signy and Livingston islands showed that nutrients and functions of nutrients (NH_4^+, chlorophyll *a*) accounted for a significant fraction of the variance in the diatom data. The transfer function was applied to ^{210}Pb-dated sediment cores from three lakes (Moss, Sombre and Heywood) receiving different levels of nutrient input from fur seal populations. Moss Lake showed relatively stable reconstructed chlorophyll *a* values, and no evidence of recent eutrophication, agreeing with measured chlorophyll *a* concentrations at the site. Changes in diatom assemblages and results of chlorophyll *a* reconstructions at Sombre Lake suggested that nutrient enrichment had occurred, which could be clearly linked to fluctuations in the measured water chemistry over the last 10-14 years. Despite recorded increases in recent nutrient inputs there was no apparent diatom response at Heywood Lake. (Auth. mod.)

B-54835
Villafañe, V.E., Helbling, E.W., Holm-Hansen, O., Sala, L., **Effects of solar ultraviolet radiation on antarctic phytoplankton during springtime ozone depletion,** *Antarctic journal of the United States,* 1994, 29(5), p.259-262, 10 refs.

In this paper, the authors are concerned with describing the impact of "normal" ultraviolet radiation (UVR), as well as enhanced UV-B radiation, on natural assemblages of phytoplankton as well as on just the nanoplankton fraction and the microplankton fraction. The studies also included estimation of the impact of UVR as influenced by the taxonomic composition of the phytoplankton and the mitigating effect of cellular UV-absorbing compounds. All studies were carried out at Palmer Station from early Oct. to the end of Dec. 1993. The ozone hole was very well developed over Palmer Station in the month of Oct; column ozone concentrations ranged from 140 to 220 Dobson units.

B-54836
Helbling, E.W., Villafañe, V.E., Holm-Hansen, O., ***In situ* inhibition of primary production due to ultraviolet radiation in Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.262-263, 6 refs.

The use of *in situ* incubations of natural phytoplankton assemblages provides the most direct and most realistic procedure to determine the effect of solar UVR on rates of primary production. In this paper, the authors report preliminary data obtained from such *in situ* incubations carried out from Oct. through Dec. 1993 at Palmer Station. Results indicate that, of the total inhibition of primary production in the upper water column (surface down to 10 m), about 65% was due to UV-A, and 35% due to UV-B. The results thus indicate that "normal" UVR has large inhibitory effects on antarctic phytoplankton in the upper water column, which are comparable to estimates discussed in previous studies.

B-54837
Marguet, E.R., Helbling, E.W., Villafañe, V.E., Holm-Hansen, O., **Effects of solar radiation on viability of two strains of antarctic bacteria,** *Antarctic journal of the United States,* 1994, 29(5), p.264-265, 6 refs.

In this article, the authors present preliminary data obtained at Palmer Station during the months of Nov. and Dec. 1993 on the effects of solar UVR on viability of isolated bacterial strains. The data indicate that bacterioplankton in antarctic waters are strongly inhibited by solar UVR and to a much lesser extent by high fluences of PAR. Although differential sensitivity of different strains to solar radiation is evident, both UV-A and UV-B apparently can seriously affect the viability and functioning of these marine bacteria. As shown by the experiments, however, this deleterious effect of UVR on bacterioplankton in the Antarctic may be mitigated to some extent by induction of the SOS system.

B-54838

Neale, P.J., Spector, A.M., **Ultraviolet absorbance by diatom populations from the Weddell-Scotia Confluence,** *Antarctic journal of the United States,* 1994, 29(5), p.266-267, 10 refs.

An investigation was made of possible effects of increased UV-B on the phytoplankton productivity during Oct. and Nov. 1993 aboard the R/V *Nathaniel B. Palmer.* The authors measured UV absorbance by phytoplankton in samples from the upper 200 m at 3 stations along a transect at 50°W. Results show that antarctic diatom species, which are important in the austral spring phytoplankton assemblage, have significant UV-absorbance. The UV-absorption coefficients for surface-layer samples are similar to other reports of UV-absorbing compounds in antarctic phytoplankton. The presence of shinorine, a mycosporine-like amino acid which has high absorbance in the UV, has been detected in these diatoms. In addition, the higher level of UV-absorbing compounds in surface-layer populations implies that high UV-absorbance is linked to exposure to near-surface irradiance.

B-54839

Ferreyra, G.A., Schloss, I.R., Demers, S., Neale, P.J., **Phytoplankton responses to natural ultraviolet irradiance during early spring in the Weddell-Scotia Confluence: an experimental approach,** *Antarctic journal of the United States,* 1994, 29(5), p.268-270, 11 refs.

During the austral spring 1993 onboard the R/V *Nathaniel B. Palmer,* the authors studied the long-term (days) effects of natural UV radiation (UV-R) on phytoplankton physiology, using fixed and variable UV filters. Primary productivity and synthesis of photoprotective substances were measured. Two experiments were carried out in an on deck incubator exposed to natural photosynthetically available radiation (PAR) and UV irradiance. Because the pattern of the 2 experiments carried out was similar, only data corresponding to Nov. 6 and 8 are presented here (second experiment). During this experiment, the dominant phytoplankter in all the incubation chambers was the colonial diatom *Thalassiosira gravida.* Only one UV-absorbing compound could be detected by HPLC analysis. It is suggested that under variable light conditions, phytoplankton of the studied community were able to utilize the slightly greater amount of solar radiation available for photosynthesis in the UV exposed chambers. It is concluded that mixing conditions can minimize the damaging effects of UV-R on antarctic phytoplankton.

B-54841

Boucher, N., et al, ***Icecolors '93:*** **Biological weighting function for the ultraviolet inhibition of carbon fixation in a natural antarctic phytoplankton community,** *Antarctic journal of the United States,* 1994, 29(5), p.272-275, 18 refs.

This study was conducted at Palmer Station prior to the opening of the ozone "hole" and during the onset of depletion, onboard the R/V *Polar Duke* along the Antarctic Peninsula for the remainder of the austral spring. In 1993 the ozone hole developed in early Aug. and did not close before late Dec. It was the most severe depletion ever recorded over the Antarctic Peninsula. The authors introduce the results from an experiment designed to estimate a biological weighting function for primary production inhibition in antarctic phytoplankton under natural irradiance. They present the newly derived function and show that the sensitivity of *in situ* antarctic phytoplankton to ambient UV-B (280-320 nm) at the end of the winter was greater than that measured under artificial light conditions for temperate marine phytoplankton and terrestrial plants.

B-54842

Evens, T., Roll, S., Golden, B., Prézelin, B.B., ***Icecolors '93:*** **Epilithic productivity by microalgae exhibits a potentially high sensitivity to natural levels of ultraviolet-B radiation,** *Antarctic journal of the United States,* 1994, 29(5), p.275-277, 7 refs.

The authors documented the potential impact of ultraviolet radiation (UVR) on littoral microalgae (lithophytes), which are almost always highly exposed to deleterious light effects. This experiment was conducted at Palmer Station on Dec. 30, 1993. The UV-B inhibition ranges obtained in the study are generally greater than those found for pelagic and sea-ice algal communities, whereas the UV-A inhibitions are generally much less. These results show the potential, but not the verification, of *in situ* performance of these types of communities.

B-54843

Jovine, R.V.M., Prézelin, B.B., ***Icecolors '93:*** **Beginnings of an antarctic phytoplankton and bacterial DNA library from southern ocean natural communities exposed to ultraviolet-B,** *Antarctic journal of the United States,* 1994, 29(5), p.277-279, 7 refs.

Springtime ozone depletion and the resultant increase in ultraviolet-B (UV-B) radiation (280-320 nm) have deleterious effects on primary productivity. To assess damage to cellular components other than the photosynthetic apparatus, the authors isolated total community DNA from samples in the field before, during, and after the 1993 springtime depletion in stratospheric ozone. They collected 17 bacterial and 70 discrete phytoplankton samples under pack ice, from open surface waters, or from frazil ice in Arthur Harbor. Preliminary analysis of the phytoplankton UV-B induced photoproducts indicates for the first time that DNA damage in natural phytoplankton communities is evident even before julian day 250, in spite of all the factors that may reduce the impact or exposure to UV-B. Microsporinelike amino acids (MAAs), mixing water masses, and pack ice confer only partial protection from UV-B. Some samples collected early in the morning before sunrise still retained significant amounts of photodamage from the previous day.

B-54862

Peck, L.S., **Metabolism and feeding in the antarctic brachiopod *Liothyrella uva:* a low energy lifestyle species with restricted metabolic scope,** *Royal Society of London. Proceedings. Series B,* Feb. 22, 1996, 263(1367), p.223-228, Refs. p.227-228.

The effect of feeding on metabolism (specific dynamic action, SDA) was assessed in the articulate brachiopod *Liothyrella uva* (Broderip, 1833) at Signy I. The response was low and on a much longer timescale than previously reported SDA responses. Oxygen consumption rose post-prandially to a peak which was 1.64 x higher than the prefeeding basal metabolic rate. The response peaked on the 5th day and returned to basal levels on the 18th day after feeding. Maximum metabolic scope was therefore restricted, and was 0.41 μmolO_2/h (24.5 microwatts) for a 290 mg ash-free dry mass individual. Ammonia excretion was little affected by feeding, except for a short sharp peak on the 4th post-prandial day. Metabolic O:N ratios were very low, ranging from 2.9 to 6.6 and indicated an almost sole use of protein to fuel metabolism throughout. Urea excretion showed no pattern in relation to feeding, and accounted for around 7% of nitrogen excreted. It is suggested that metabolic scope is limited in *L. uva* for two reasons: because it has evolved to live at low temperatures and because of phylogenetic limitations related to articulate brachiopod lifestyles. (Auth.)

B-54891

Zummo, G., Acierno, R., Agnisola, C., Tota, B., **Heart of the icefish: bioconstruction and adaptation,** *Brazilian journal of medical and biological research,* Nov.-Dec. 1995, 28(11-12), p.1265-1276, 40 refs.

The Channichthyidae or "icefish" represent an example of extreme adaptation to the stable low temperature and high oxygen content of the antarctic waters. The lack of respiratory pigments in these teleosts is associated with relatively low oxygen consumption and relevant volume, increased relative heart weight, and very high cardiac output. The heart has the ability to displace large systolic volumes at a low rate and relatively low pressure, with large ventricular fillings, while it is incapable of facing increased afterloads. These functional aspects of mechanical flexibility and restrictions of the cardiac pump have been tentatively related to some constructional aspects of the icefish cardiomegaly, particularly at the whole ventricular level, to the trabeculate type of myo-architecture, and at the subcellular level, to the conflict in space economy between the exceptionally high mitochondrial densities and the consequent severe reduction in myofibrillar volume. (Auth. mod.)

B-54892

Butler, P.J., Bevan, R.M., Woakes, A.J., Croxall, J.P., Boyd, I.L., **Use of data loggers to determine the energetics and physiology of aquatic birds and mammals,** *Brazilian journal of medical and biological research,* Nov.-Dec. 1995, 28(11-12), p.1307-1317, 40 refs.

By deploying a data logger specifically designed for the purpose, it was possible to record heart rate, f_H (beats/min), from free-ranging gentoo penguins and antarctic fur seals at Bird I. The heart rate data were then converted into oxygen consumption (VO_2, ml O_2/min/kg) and/or energy expenditure (W/kg) using equations derived from calibration experiments. Field data from 15 penguins indicate that the f_H method provides data that are comparable to those obtained using the doubly labelled water (DLW) method, but with the added advantage that they can be broken down into the energy costs for specific types of behavior. The implanted data loggers also recorded the temperature of the abdominal cavity (T_{ab}); this routinely decreased by approximately 2°C during diving bouts and by a maximum of almost 5°C. Field data from 15 female fur seals indicate that when the animals are ashore, there is good agreement between the values for mean energy expenditure obtained by the f_H and DLW methods. However, when the animals are at sea, the values obtained by DLW are substantially greater than those obtained by f_H. (Auth. mod.)

B-54893

Kochkin, P.N., **On estimates of natural mortality of the mackerel icefish, *Champsocephalus gunnari* (Channichthyidae), in the South Georgia Island area,** *Journal of ichthyology,* Dec. 1995, 35(7), p.153-157, Translated from Voprosy ikhtiologii, 35(3), 1995. 19 refs.

For determining optimal catch of *Champsocephalus gunnari,* one of the most common commercial antarctic fish, it is important to know its natural mortality. The numerical representation of this mortality is the "instantaneous natural mortality rate," which is analyzed in this article. (Auth.)

B-54896

Arístegui, J., Montero, M.F., Ballesteros, S., Basterretxea, G., van Lenning, K., **Planktonic primary production and microbial respiration measured by ^{14}C assimilation and dissolved oxygen changes in coastal waters of the Antarctic Peninsula during austral summer: implications for carbon flux studies,** *Marine ecology progress series,* Feb. 29, 1996, 132(1-3), p.191-201, 67 refs.

Oxygen consumption and production and carbon fixation by microorganisms were measured simultaneously in coastal surface waters near the Antarctic Peninsula. Although there was a good qualitative agreement between the oxygen and carbon measurements, total daily water-column integrated carbon incorporation measured by radiocarbon uptake in the particulate fraction underestimated net community production measured by the oxygen method by 29 to 54% (using a photosynthetic quotient of 1.5). Unaccounted-for exudation of dissolved organic carbon during the ^{14}C uptake experiments may explain this discrepancy. Respiratory carbon losses by micro-organisms (largely phytoplankton) ranged between 10 and 50% of gross production, the highest values corresponding to the more productive stations. These results show that microbial respiration is an important part of the carbon flux of coastal antarctic plankton. Unless it is considered in carbon flux models, the contribution of higher trophic levels to the carbon fluxes in marine food webs may be seriously overestimated. (Auth. mod.)

B-54897

Weidinger, K., **Patterns of colony attendance in the Cape Petrel *Daption capense* at Nelson Island, South Shetland Islands, Antarctica,** *Ibis,* Apr. 1996, 138(2), p.243-249, 30 refs.

The annual cycle of colony attendance of the Cape Petrel at Nelson I. covered about 9 months from the start of Sep. until the end of May. Large numbers of birds attended the colony continuously for 6 months from arrival until fledging, except for a 2-week incomplete pre-laying exodus when attendance was reduced to 10% of that during incubation. After 1 month (Mar.) of post-fledging absence, birds returned to the colony for 2 months in numbers comparable to the level in the breeding season. This was followed by a winter absence that lasted only 3 months and was interrupted by two short visits by a small number of birds. Mean attendance was highest during incubation, but short peaks of maximum attendance occurred during the pre-breeding period. Colony counts were the most consistent during the second half of incubation, when the lowest counts gave an estimate of the number of breeding pairs and peak numbers an impression of the additional number of attending nonbreeders. (Auth. mod.)

B-54901

Boyd, I.L., **Individual variation in the duration of pregnancy and birth date in antarctic fur seals: the role of environment, age, and sex of fetus,** *Journal of mammalogy,* Feb. 1996, 77(1), p.124-133, 37 refs.

The duration of 506 pregnancies in antarctic fur seals was measured from 1983-1993. On average, pregnancy lasted 359 days, with a range of 340-390 days, representing 20% of the period of post-implantation fetal growth. Pregnancy was longest and birth dates latest in years associated with reduced availability of food. Sex of fetus and birth mass had no effect on the duration of pregnancy or date of birth. However, dates of parturition tended to be consistent within individuals. (Auth.)

B-54902

Øvstedal, D.O., Elix, J.A., Smith, R.I.L., **New species of *Parmelia* (lichenized Ascomycotina) from the Antarctic,** *Mycotaxon,* Jan.-Mar. 1996, Vol.57, p.151-153, 4 refs.

A species of *Parmelia* (lichenized Ascomycotina) from the Antarctic: *Parmelia lindsayana* Øvstedal & Elix from Signy I. is described as new. This species resembles *P. protosulcata* Hale and *P. cunninghamii* Crombie, but differs in morphological details and in containing usnic, α-collatolic and alectoronic acids. (Auth.)

B-54903

Brey, T., Pearse, J., Basch, L., McClintock, J., Slattery, M., **Growth and production of *Sterechinus neumayeri* (Echinoidea: Echinodermata) in McMurdo Sound, Antarctica,** *Marine biology,* Dec. 1995, 124(2), p.279-292, 51 refs.

Population dynamics of *Sterechinus neumayeri* were investigated at four sites in McMurdo Sound: Cape Evans, McMurdo Station, East Cape Armitage and New Harbor. The annual formation of natural growth bands in the jaws of the Aristotle's lantern was verified by a tagging-recapture experiment. Growth functions based on natural growth bands indicated differences among stations but showed *S. neumayeri* to be a slow growing species, reaching its maximum diameter of 70 mm at an age of about 40 yr. Annual production ranged between 2.4 (C. Evans) and 0.65 g ash free dry mass/m^2 (New Harbor) and was related to differences in food conditions. More than 95% of total production was invested in reproduction, with less than 5% invested in somatic growth. Consumption estimates for *S. neumayeri* show this species to play a significant role in the benthic trophic web of McMurdo Sound. (Auth.)

B-54904

Crocker, K.M., Ondrusek, M.E., Petty, R.L., Smith, R.C., **Dimethysulfide, algal pigments and light in an antarctic *Phaeocystis* sp. bloom,** *Marine biology,* Dec. 1995, 124(2), p.335-340, 47 refs.

Dimethylsulfide (DMS) concentrations in sea water were found to be high (0.19 to 390 nM) in an antarctic bloom of *Phaeocystis* sp. during Oct. and Nov. 1990. DMS concentrations were positively correlated with algal pigments, particularly 19'-hexanoyloxyfucoxanthin, a prymnesiophyte pigment. Concentrations of DMS varied diurnally, possibly due to effects of sunlight, although the exact mechanism is not known. Since oceanic DMS production has been linked to the global albedo through the formation of cloud condensation nuclei, light-mediated changes in DMS concentrations may affect the global climate. (Auth. mod.)

B-54910

Gonzalez-Cabrera, P.J., Dowd, F., Pedibhotla, V.K., Rosario, R., Stanley-Samuelson, D., Petzel, D., **Enhanced hypo-osmoregula-**

tion induced by warm-acclimation in antarctic fish is mediated by increased gill and kidney Na$^+$/K$^+$-ATPase activities, *Journal of experimental biology,* Nov. 1995, 198(11), p.2279-2291, 45 refs.

DLC QH301.J68, v.198, Nov.11, 1995

Serum osmolality and serum inorganic ion concentrations were studied in two antarctic fish species, *Trematomus bernacchii* and *T. newnesi,* during 5 weeks of acclimation to 4°C and compared with control values for groups acclimated to -1.5°C. Acclimation to 4°C significantly decreased the serum osmolality of both species, thereby increasing their seawater-to-extracellular fluid (ECF) osmotic gradient. Biochemical progressions are described as the experiment proceeded and changes in gill, kidney, liver, and muscle tissues are observed. The results indicate that acclimation to 4°C induced a decrease in serum osmolality which resulted from the positive compensation of Na$^+$/K$^+$-ATPase in osmoregulatory tissues. The enhancement in Na$^+$/K$^+$-ATPase activity at 4°C suggests that energy expenditure in antarctic fish may be lessened in part by maintaining a reduced seawater-to-ECF osmotic gradient. (Auth. mod.)

B-54952

Srinivasan, M., Mathew, K.J., **Distribution of Chaetognatha off Queen Maud Land, Antarctica,** *Marine Biological Association of India. Journal,* Dec. 1992, 34(1-2), p.287-290, 12 refs.

Chaetognaths from zooplankton samples collected between latitude 67°30'S and 68°30'S and longitudes 14°00'E and 20°00'E off Queen Maud Land were studied. The investigation revealed the occurrence of *Eukrohnia fowleri, E. hamata, Sagitta gazellae* and *S. tasmanica.* Among these four species, *E. hamata* formed 93% of the total chaetognaths. The numerical abundance of chaetognaths from the stations located in the southern, middle and northern latitudinal grids was studied and the spatial distribution of the species is reported. (Auth.)

B-54953

Ram, M.J., Goswami, S.C., **Observations on phytoplankton pigments, zooplankton and physico-chemical parameters in surface waters from southern Indian Ocean and antarctic region,** *Mahasagar,* Dec. 1993, 26(2), p.123-131, Refs. p.130-131.

Observations on distribution of chlorophyll *a,* phaeopigments, zooplankton and physico-chemical parameters in the southern ocean were carried out during the 9th Indian Antarctic Expedition (1989-1990). Results indicate high phytoplankton biomass in terms of chl *a.* The values of chl *a* and phaeopigment ranged from 0.51 to 6.4 and 0.05 to 0.62 mg/m^3, respectively. The zooplankton standing stock (biomass) values fluctuated between 3.1 and 62.2 ml/100 m^3 and showed an inverse relationship with chl *a* and phaeopigments. Copepods, euphausiids, decapods, polychaetes and chaetognaths were the major constituents of the zooplankton community. The salinity values varied from 34.06 to 36.14 x 10^{-3}. Temperature fluctuations of the seawater were pronounced (-0.5 to 29.5°C) and appeared to influence the distribution and abundance of plankton. The nutrient concentrations at various stations were high. (Auth.)

B-54954

Hurford, W.E., et al, **Splenic contraction, catecholamine release, and blood volume redistribution during diving in the Weddell seal,** *Journal of applied physiology,* Jan. 1996, 80(1), p.298-306, 34 refs.

The spleen of the Weddell seal may contract and inject red blood cells (RBCs) into the peripheral circulation during diving, but evidence for this hypothesis is indirect. Accordingly, splenic dimensions were measured by ultrasonography, plasma catecholamine concentrations, hemoglobin concentration, and hematocrit in five Weddell seals before and after intravenous epinephrine during halothane anesthesia and while awake at the surface after voluntary dives. Spleen size was reduced immediately after epinephrine injection or after the seal surfaced. Splenic size increased after the seal surfaced and was inversely correlated with plasma epinephrine and norepinephrine concentrations. Hemoglobin concentration increased during general anesthesia and in the first 2 min after surfacing. At these same times, the hematocrit also increased. An estimated 20.1 liters of RBCs were sequestered at rest, presumably in the spleen, and released either on epinephrine injection or during diving. Catecholamine release and splenic contraction appear to be an integral part of the voluntary diving response of Weddell seals. (Auth. mod.)

B-54955

Starý, J., Block, W., **Oribatid mites (Acari: Oribatida) of the Falkland Islands, South Atlantic and their zoogeographical relationships,** *Journal of natural history,* Apr. 1996, 30(4), p.523-535, 24 refs.

A total of 21 species of oribatid mites (Acari: Oribatida) are recorded from heat-extracted samples of soil and plant material collected in the Falkland Is., South Atlantic. Previous records of a further 11 species provide a total of 32 species. The distribution of each non-endemic species recorded from the Falklands is figured. The oribatid mite fauna of these islands belongs to the Neotropical Region with strong sub-antarctic elements and some similarities with New Zealand. (Auth.)

B-54963

Pakhomov, E.A., **Faunistic makroplankton complexes in the Commonwealth Sea** [Faunisticheskie kompleksy makroplanktona v more Sodruzhestva], *Antarktika,* 1993, No.32, p.94-108, In Russian with English summary. 56 refs.

The quantitative composition and distribution of macroplankton in the Maud Rise area arc studied on the basis of macroplankton sampling in the 0-200 m layer using an Isaaks-Kidd trawl in the 1987 and 1988 summer seasons. During the periods under investigation the biomass of the predominant macroplankton were *Euphausiacea* (65-74%), *Euphausia superba* (62-72%) and *Salpa thompsoni* (up to 32%). The main macroplankton biomass was 50 and 95 g/1000 m^3 in 1987 and 1988 respectively. The main macroplankton accumulations were of salps and krill in the northern part of the area (61-62°S), and of krill in the Continental Water Boundary zone above the continental slope. Cluster analysis enabled a distinction to be made between 4 groups of stations in different sea areas, where the populations can be regarded as communities: the shelf and oceanic communities, and the southern intermediate and northern intermediate communities. The northern intermediate community constitutes the ecotone. (Auth.)

B-54965

Zernova, V.V., **Vertical distribution of species of planktonic algae typical of the southern ocean** [Vertikal'noe raspredelenie kharakternykh vidov planktonnykh vodorosleĭ iuzhnogo okeana], *Antarktika,* 1993, No.32, p.125-140, In Russian with English summary. 17 refs.

The characteristics of the seasonal variations in the vertical structure of the five most abundant species of planktonic algae of the southern ocean are discussed. In the mixed waters of spring and autumn these species are all distributed more evenly than in the stratified waters of summer, when the greatest concentration of cells is above the pycnocline. Significant differences in the onset and duration of vegetation of the discussed species, as well as differences in the value of maximum and its position in the water column, are identified. (Auth.)

B-54967

Döhler, G., **Effect of UV irradiance on utilization of inorganic nitrogen by the antarctic diatom *Odontella weissflogii* (Janisch) Grunow,** *Botanica acta,* Feb. 1996, 109(1), p.35-42, Refs. p.40-42.

The impact of UV-B irradiation on unialgal cultures of the temperate marine diatom *Odontella sinensis* and of the antarctic *Odontella weissflogii* was tested under controlled laboratory conditions. Uptake rates of inorganic nitrogen by *O. sinensis* were more affected by UV-B radiation than those of *O. weissflogii.* Utilization of ^{15}N-ammonium was reduced after 3 h of UV-B exposure. Contents of the chlorophylls are markedly affected by UV-B under red light whereas the chlorophyll *a* concentration is enhanced in blue and green light. UV-B exposure in conjunction with blue and green light led to a reduction of the protein content and an increase in the amino acid contents. The pattern of pool sizes of free amino acids varied after UV-B exposure. UV-A irradiance had no effect. The possible targets of UV-B irradiation on the uptake system of inorganic nitrogen are discussed in detail. Adaptation to the environmental conditions, e.g. via synthesis of UV stress proteins or mycosporine-like amino acids, was also considered. (Auth. mod.)

B-54970

Montgomery, J.C., Wells, R.M.G., **Recent advances in the ecophysiology of antarctic notothenioid fishes: metabolic capacity and sensory performance,** Fish ecophysiology. Edited by J.C. Rankin and F.B. Jensen, London, Chapman & Hall, 1993, p.341-374, Refs. p.368-374.

DLC QL639.1.F553 1993

The Antarctic provides a special opportunity for studying the physiological consequences of ecological differences among fishes, without the attendant difficulty of comparing species from diverse phylogenetic backgrounds. The present review has two themes. First, the monophyletic radiation of notothenioid fishes has occurred over a comparatively short evolutionary time scale and in a low-competition environment. Therefore, one should not expect to find perfect matching between structural design and function. Second, some of what is observed in antarctic fishes may be epiphenomenal and reflect current utility, or simply the plasticity of the phenotype, so it cannot be assumed that all the observed traits arose by natural selection.

B-54972

Bock, C., Jacob, A., Kirst, G.O., Leibfritz, D., Mayer, A., **Metabolic changes of the antarctic green alga *Prasiola crispa* subjected to water stress investigated by *in vivo* ^{31}P NMR,** *Journal of experimental botany,* Feb. 1996, 47(295), p.241-249, 43 refs.

The energy status and the phosphate metabolism of the antarctic green alga *Prasiola crispa* during and after desiccation stress was investigated by *in vivo* ^{31}P NMR. The effect of desiccation was simulated by addition of the non-ionic osmoticum PEG 200 (polyethylene glycol). Photosynthesis and respiration were effectively inhibited under these conditions. The most notable changes in the *in vivo* ^{31}P NMR spectra were an increase in the cytoplasmic inorganic phosphate signal after PEG stress, a decrease in the polyphosphates and a low-field shift of the core polyphosphate signal followed by an appearance of extracellular inorganic phosphate. Cytoplasmic pH remained almost constant during stress. After a return to control conditions, photosynthesis and respiration recovered within 4 h as did the concentrations of the phosphorus metabolites. It is suggested that phosphate metabolism and complexation of cations to polyphosphates may play an important role in the distinct desiccation tolerance of *P. crispa.* (Auth. mod.)

B-54983

Constantinescu C., F., Torres N., D., **Bioanthropological analysis of a human skull from Cape Shirreff** [Análisis bioantropológico de un cráneo humano hallado en cabo Shirreff, isla Livingston, Antártica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.89-99, In Spanish with English summary. 9 refs.

Results of the bioanthropological analysis of a human skull found at Cape Shirreff are reported. On the basis of the characteristics of the glabella, the supraorbital and occipital processes, it is inferred that the skull is that of a human female. The degree of ossification of the synarthrosis, and the eruption of the 3rd molar indicate an approximate age of 21 yrs. The skull's general shape, the long and low nasals, the presence of malar and zygomathic tubercles, and the angular zygomaxillar suture are indicative of an individual of mongoloid characteristics, but the orbital high, the narrowness of the nasal bones, and the presence of the Carabelli's cusp in the 3rd molar indicate caucasoid characteristics. (Auth. mod.)

B-54984

García R., M., Aguayo L., A., Torres N., D., **Behavior of antarctic fur seal bulls at Cape Shirreff during the mating season** [Aspectos conductuales de los machos de lobo fino antártico, *Arctocephalus gazella* en cabo Shirreff, isla Livingston, Antártica, durante la fase de apareamiento], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.101-112, In Spanish with English summary. 11 refs.

The behavior of harem bulls of *Arctocephalus gazella* during the mating period is described in order to determine the reproductive strategy in the study area. The observations were made from Dec. 13, 1992 to Jan. 4, 1993 on a beach at Cape Shirreff. Thirteen harem bulls were observed twice a day between 09:00 and 23:00, totaling 72 hr and 20 min. A behavioral repertoire was made with 29 patterns, classified in 4 principal functions: resting, patrolling, aggressiveness, and female attention. The results on the variety of territorial areas, different behavior among harem bulls according to territories occupied, the variation of female numbers in territories, and the number of mates in each one are presented and discussed. It is concluded that territorial boundaries are modified during the breeding season. The study group shows a mating system in which female attention by harem bulls has priority over the territorial defense. This strategy has been named polygamous-territorial. (Auth.)

B-54985

Camus, P.A., **Size structure and spatial variation of the antarctic limpet *Nacella concinna* (Strebel, 1908) on King George Island, South Shetland, Antarctica,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.115-122, With Spanish summary. 5 refs.

This note documents the size structure and spatial variation of density in an intertidal population of the limpet *Nacella concinna* at Maxwell Bay. Five sites were selected for transect sampling, measuring the density and shell length of limpets and the algal cover. A sixth site located at the intertidal-subtidal boundary was sampled for comparison. The length of limpets captured by kelp gull and deposited in shell middens located 500 m south of the bay was also measured. The spatial variation in density was estimated by its coefficient of variation (CV). Limpet density increased from high to low intertidal levels, and decreased from the entrance to the center of the bay. There was a significant negative relationship between CV and mean density in the intertidal, while in the subtidal boundary limpets were more abundant and more variable since they were aggregated on algal patches. On the other hand, the size of *N. concinna* did not differ among tidal levels, although it slightly decreased towards the low intertidal, and was significantly greater in shell middens, suggesting that kelp gulls mainly consume mature individuals. (Auth.)

B-54986

Torres N., D., Jorquera F., D., **Baseline for monitoring of marine debris at Cape Shirreff** [Línea de base para el seguimiento de los desechos marinos en cabo Shirreff, isla Livingston, Antártica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.131-141, In Spanish with English summary. 9 refs.

As a complementary activity related to studies on the population of *Arctocephalus gazella* at Cape Shirreff, and with the purpose of having a baseline for further studies on marine debris, a collection of recent and old waste from the beaches of the site was carried out. Even though the total amount of waste was estimated at about 600 kg, it was possible to carry away 1,754 objects collected from 36 beaches, with a total of 284.29 kg. As in previous studies on beach litter carried out on the site, the marine debris collected was composed of plastic and synthetic fibers (92%), metal (3.5%), glass (3.4%), and paper (1.1%). (Auth. mod.)

B-54987

Torres N., D., **Review of studies at SSSI No.32 and CEMP Site "Cape Shirreff and San Telmo Island"** [Antecedentes y proyecciones científicas de los estudios en el SEIC No.32 y Sitio CEMP "Cabo Shirreff e islotes San Telmo", isla Livingston, Antártica], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.143-169, In Spanish with English summary. Refs. p.165-169.

This note has the purpose of summarizing the principal results of the scientific research carried out in the SSSI No.32 area at Cape Shirreff and San Telmo I., and to suggest other scientific activities aimed at continuing to give the area its status of SSSI. The discussion covers geomorphological, geological, biological, hydrographic and historic-archeological features of the area, emphasizing the need to preserve the site through 1999, so that monitoring of future changes in its biota and environment can be carried out.

B-54988

Egginton, S., **Blood rheology of antarctic fishes: viscosity adaptations at very low temperatures,** *Journal of fish biology,* Mar 1996, 48(3), p.513-521, 22 refs.

Viscosity of whole blood and plasma from antarctic fishes were compared over a temperature range of -1.5 to 5°C; human samples and water provided reference values. Blood viscosity of nototheniids was greater than that of the haemoglobinless icefish, reflecting differences in packed cell volume, being 5.27 vs. 3.27 cP at 0°C for *Notothenia coriiceps* and *Chaenocephalus aceratus,* respectively. The reduction in MCHC, rather than haematocrit, in nototheniids suggests that selection pressure has not acted at the level of oxygen transport. However, icefish plasma viscosity was similar to human, but greater than that of *Notothenia* spp., suggesting that viscometric influences on cardiac afterload may be adaptive for the latter. Indeed, handling of stress induced a significant increase in viscosity of both whole blood and plasma, which may impair cardiovascular performance. Such a response was not observed in icefish, and in view of their large blood vessels it is unlikely that viscosity plays any significant role in limiting activity of this species. (Auth.)

B-54991

Quesada, A., Vincent, W.F., **Adaptation of cyanobacteria to the light regime within antarctic microbial mats,** *International Association of Theoretical and Applied Limnology. Verhandlungen. Proceedings. Traveaux,* Dec. 1993, 25(Part 2), p.960-965, Congress in Barcelona 1992. Edited for the Association by A. Sládečkova. 17 refs.

DLC QH98.I5 v.25, pt.2 1992

Examined here are the photoadaptive responses of an antarctic cyanobacterium to changes in light intensity and quality. The aim was to examine the implications of the *in situ* irradiance regime of antarctic microbial mats for cellular growth and pigmentation. The small pond studied is on the McMurdo Ice Shelf ablation zone containing, like other ponds throughout the region, a thick epilithic film of cyanobacteria. Environmental and microbial community measurements were made in this pond, and one of the cyanobacterial dominants was brought into culture. The authors measured the physiological responses of this isolate to a range of irradiances, including spectral conditions similar to those recorded in the field. (Auth. mod.)

B-54993

Bayly, I.A.E., Burton, H.R., **Beaver Lake, Greater Antarctica, and its population of *Boeckella poppei* (Mrázek)(Copepoda:Calanoida),** *International Association of Theoretical and Applied Limnology. Verhandlungen. Proceedings. Traveaux,* Dec. 1993, 25(Part 2), p.975-978, Congress in Barcelona 1992. Edited for the Association by A. Sládečkova. 17 refs.

DLC QH98.I5 v. 25, pt. 2 1992

Beaver Lake represents an epishelf lake, which occur in Antarctica at the continental margin confined between permanent ice shelves and coastal rock. The upper fresh water is dammed by ice and rock walls, and the bottom of the lake is an arm of the sea extending beneath the ice shelf. Beaver Lake is dammed by the Amery Ice Shelf which is more than 400 m thick. Two epishelf lakes, Ablation and Moutonnée, lie on the coast of Alexander I. bordering George VI Sound. Ablation Lake (located at precisely the same latitude as Beaver Lake but on the opposite side of Antarctica) has a layer of fresh water some 55 m deep. Despite its striking combination of features, remarkably little is known about the biology of Beaver Lake. In 1958, members of an Australian National Antarctic Research Expedition observed small, white animals swimming in pools of water in tide-cracks on Beaver Lake. None were collected but it seems likely that these were copepods. During the summer of 1990-91 the Australian Antarctic Division secured a sample of zooplankton from Beaver Lake. This sample, although small, contained a few adults of *Boeckella popei* and provided the basis for the present account. (Auth. mod.)

B-55002

Zdzitowiecki, K., **Description of *Lecithochirium whitei* sp. n. (Digenea, Hemiuroidea) from the antarctic mesopelagic fish, *Bathylagus antarcticus* Günther,** *Acta parasitologica,* Jan. 1994, 39(1), p.1-4, 14 refs.

Lecithochirium whitei sp. n. is the first representative of this genus occurring in the Antarctic and the first digenean species normally parasitizing pelagic fishes in this region. The species is tentatively assigned to the *"Microstomum*-group". It has larger eggs (0.027-0.038 x 0.017-0.021 mm) than most of other *Lecithochirium* spp., including all belonging to the *"Microstomum*-group", and differs from species having similar egg dimensions in the arrangement of gonads and vitelarium, as well as in the intestinal caeca and uterine loops not penetrating into the ecsoma. (Auth.)

B-55003

Wojciechowska, A., Zdzitowiecki, K., Pisano, E., Vacchi, M., **Tetraphyllidean cercoids from bony fishes occurring in the Ross Sea (Antarctic),** *Acta parasitologica,* Jan. 1944, 39(1), p.13-15, 6 refs.

Three forms of tetraphyllidean cercoids occurring in the alimentary tract of bony fishes are described. Cercoids with bilocular bothridia (probably *Pseudanthobothrium* sp.) and with trilocular bothridia (probably *Oncobothrium* sp.) are similar to those occurring at the South Shetland Is. Cercoids with subcylindrical bothridia (possibly *Marsupiobothrium* sp.) are for the first time described from the Antarctic. Results indicate the presence of representatives of not less than three tetraphyllidean genera in elasmobranchs (probably skates) found in the Ross Sea. (Auth.)

B-55010

Wynn-Williams, D.D., **Response of pioneer soil microalgal colonists to environmental change in Antarctica,** *Microbial ecology,* 1996, 31(2), p.177-188, 28 refs.

Light-dependent, temperature-sensitive, fast-growing organisms respond to physical and biogeographical changes. Microalgae (cyanobacteria and eukaryotic algae), which are pioneer colonists of antarctic mineral fellfield soils, are therefore highly suitable biological indicators of such changes. In frost-heaved soil polygons containing naturally sorted fine mineral particles, microalgal growth is restricted to a shallow zone of light penetration. By virtue of this light requirement, microalgae are exposed to extreme seasonal fluctuations in temperature (air and blackbody radiation), photosynthetically active radiation, UV radiation, and desiccation. Dominance of conspicuous autofluorescent indicator species with distinctive morphology allowed quantification of responses using epifluorescence microscopy and image analysis of undisturbed, unstained communities. Evidence of community succession correlated with measured changes in local environment was found. Results from Signy I. and at continental sites on Alexander I. suggest that rates of microalgal colonization and community development might change significantly during current climate changes in Antarctica. (Auth. mod.)

B-55011

Fukui, Y., et al, **Relationships among morphological status, steroid hormones, and post-thawing viability of frozen spermatozoa of male minke whales *(Balaenoptera acutorostrata),*** *Marine mammal science,* Jan. 1996, 12(1), p.28-37, Refs. p.35-37.

Spermatozoa from 21 mature minke whales taken in the antarctic ocean for Japanese research were recovered from vasa deferentia, diluted 1:9 in a Tris-based diluent, and frozen at -80°C on board the vessel. After a period ranging from 45 to 125 d, the samples were transferred to liquid nitrogen and transported to the laboratory. After thawing at 37°C, the motility (percentage of motile spermatozoa), vitality (proportion of live spermatozoa), and sperm concentration were determined for each sample. These values were tested for correlations with morphological measurements (body size, body weight, testis weight) and serum concentrations of progesterone (P_4), estradiol-17β (E_2), and testosterone (T). Ten of 21 samples had motile spermatozoa (2-40%). Although no motile spermatozoa were observed in 11 samples, all sperm samples were examined by eosin-nigrosin staining and showed vitality levels of 3-44%. It was found that the motility ($r=0.54$) and vitality ($r=0.53$) of the spermatozoa were significantly ($P<0.01$) correlated with the E_2 levels. Serum T levels were significantly correlated with the E_2 levels ($r=0.58$, $P<0.01$), but sperm concentrations were not correlated with either E_2 or T levels. The present study demonstrates that spermatozoa of minke whales can be successfully cryopreserved. (Auth.)

B-55013

Arnbom, T., Lundberg, S., **Notes on *Lepas australis* (Cirripede)**

recorded on the skin of southern elephant seal (*Mirounga leonina*), *Crustaceana,* July 1995, 68(pt.5), p.655-658, 16 refs.

Barnacles were collected from the skins of elephant seals at Husvik, South Georgia, in the subantarctic Atlantic Ocean. Analysis provides data concerning barnacle breeding cycles and geographic distribution related to the conveyance of barnacle larvae by elephant seal hosts.

B-55033

McLaughlin, R.B., **Diatoms: Diatom microscopy; *Chaetoceros bulbosum* (Ehr.) Heiden, a diatom from the Antarctic,** *Microscope,* 1995, 43(3), p.153-157, 6 refs.

In this essay the author presents a brief history of the antarctic diatom *Chaetoceros bulbosum* (Ehr.) Heiden. The form was first described by C.A.F. Castracane degli Antelminelli from a specimen collected south of Heard I. *c* 1873-1876, during the HMS *Challenger* expedition under the command of Captain George S. Nares. Drawings of individual specimens are included and provided with nicknames suitable to their outlines: Sumo Wrestler, Cheerleader, Stealth Bomber, Goalie, Basketball Player, Big Goalie, Ballet Dancer, and Weight Lifter. The species appears to be solitary and difficult to find, almost to the point of being declared a rare species.

B-55035

Weykam, G., **Photosynthetic characteristics and life strategies of antarctic macroalgae** [Photosynthese-Charakteristika und Lebensstrategien antarktischer Makroalgen], *Berichte zur Polarforschung,* 1996, No.192, 132p., In German with English summary. Refs. p.115-131.

In the present study the photosynthesis of antarctic macroalgae and the influence of the seasonally strongly changing light factor on photosynthesis were investigated. Photosynthetic characteristics were determined in field material of numerous macroalgal species common to the South Shetland Is. and are discussed in relation to thallus morphology and carbon:nitrogen ratios. The influence of the seasonally changing day length in the Antarctic on photosynthesis was investigated in the field and in culture material of selected species. The seasonal photosynthetic pattern combined with the seasonal changes of other parameters such as contents of storage compounds and pigments give an indication of the life-strategy of the species. (Auth. mod.)

B-55037

Laturnus, F., Wiencke, C., Klöser, H., **Antarctic macroalgae—sources of volatile halogenated organic compounds,** *Marine environmental research,* 1996, 41(2), p.169-181, Refs. p.179-181.

Twenty-eight different species of macroalgae were collected from Dec. 1991 to Feb. 1992 at King George I. and investigated for their release of volatile halogenated organic compounds (VHOCs). Dibromomethane, bromoform, dibromochloromethane, bromodichloromethane, diiodomethane and chloroiodomethane were identified and their rates of release determined. For the first time the release of 1,2-dibromoethane from macroalgae is reported. Of all compounds investigated, bromoform is released in very high rates from all species studied. Dibromomethane, diiodomethane, dibromochloromethane and 1,2-dibromoethane were also major compounds, but released at lower rates. Release rates of bromodichloromethane and chloroiodomethane were very low for most species. Release of VHOCs occurred from all parts of the thallus of the macroalga. The highest rates were measured in species with a high surface-to-volume ratio. This indicates the formation of VHOC in photosynthetically and metabolically active cortex (surface located) cells. The biological role of these substances and their input into the antarctic environment is discussed. (Auth.)

B-55047

Vosjan, J.H., Van Balen, A.L.H.H., Zdanowski, M.K., **Microbial biomass and light attenuation (PAR, UV-a, UV-b) in the Weddell Sea and the effect of UV-b on the ATP content of microbes,** *Circumpolar journal,* 1996, 11(1-2), p.28-32, With Dutch summary. 10 refs.

The aim of the study reported was to describe the penetration of UV-b, UV-a and PAR in waters of the Weddell Sea and correlate this with the amount of microbes in the water; to study the effect of UV-b irradiation on the ATP content of natural populations of microorganisms and on pure cultures of antarctic bacteria, since the radiation absorbed by the microorganisms may affect the metabolism of these organisms; and to find some clues to the effect of UV-b on enzyme activities.

B-55049

Lu, C.C., Stranks, T.N., **Synopsis of *Pareledone* and *Megaleledone* species, with description of two new species from East Antarctica (Cephalopoda: Octopodidae),** *Museum of Victoria. Memoirs,* June 30, 1994, 54(1), p.221-242, 23 refs.

DLC Q93.V7 1994

A synopsis is given for species of the genus *Pareledone* from Prydz Bay: *P. adelieana* (Berry, 1917), *P. charcoti* (Joubin, 1905), and *P. harrissoni* (Berry, 1917). Two new species of *Pareledone* are described and illustrated: *P. framensis* from Fram Bank off Mac. Robertson Land, and *P. prydzensis* from Prydz Bay off the Amery Ice Shelf. A comparative description of *Megaleledone senoi* Taki, 1961 from Antarctica is also provided. (Auth.)

B-55051

Nichols, D.S., Russell, N.J., **Fatty acid adaptation in an antarctic bacterium—changes in primer utilization,** *Microbiology,* Apr. 1996, 142(pt.4), p.747-754, 25 refs.

The fatty acid composition and temperature/growth characteristics of a psychrophilic bacterium, strain ACAM 456 isolated from antarctic sea-ice, is reported. The bacterium produced acyl components that may be grouped in three different carbon chain types: even-chain, odd-chain and iso-branched odd-chain. The proportions of these chain types varied according to growth temperature, and were manipulated by growth on L-serine, L-leucine or propionic acid as sole carbon sources. *De novo* fatty acid synthesis was investigated using radioactive precursors. Compared with a controlled culture, resuspension of mid-exponential phase cells in artificial seawater led to a change in the selection and/or intracellular availability of acyl chain length components from cells declined, whereas the percentage of radiolabel present in odd-chain length components increased. (Auth. mod.)

B-55057

Coleman, C.O., Barnard, J.L., **Redescription of *Maxilliphimedia longipes* (Walker, 1906) (Crustacea: Amphipoda: Iphimediidae) from the Antarctic Peninsula,** *Museum of Victoria. Memoirs,* Sep. 30, 1991, 52(2), p.291-298, 7 refs.

DLC Q93.V7 1991

New figures and a description of this species are presented. The genus is the most primitive in the Iphimediidae; the characters involved in this decision are listed. (Auth.)

B-55059

Londraville, R.L., **Isolation and characterization of intracellular fatty acid-binding protein from antarctic and temperate-zone fishes,** Portland, University of Maine, 1994, 98p., University Microfilm order No. DA94-34210, Ph.D. thesis. Refs. p.90-98.

Intracellular fatty-acid binding protein (FABP) is isolated and characterized from aerobic skeletal-muscle of the antarctic icefish *Chaenocephalus aceratus* and the striped bass *Morone saxtilis.* Molecular weight of *C. aceratus* FABP (CA-FABP) is estimated at 14936 Da by electrospray mass spectrometry, while *M. saxtilis* FABP (MS-FABP) has a molecular weight of 14800 Da, as estimated by SDS-PAGE. CA-FABP and MS-FABP share many characteristics with homologous mammalian proteins. A 51 amino-acid residue sequence from CA-FABP aligns with 74% identity to mammalian heart-type FABP, and amino-acid composition analysis for MS-FABP suggests that it also is a heart-type FABP. Direct comparison between CA-FABP and mammalian (rat) heart-FABP in parallel binding assays reveals that neither protein's affinity for fatty acids is affected by membrane composition, fatty-acid degree of saturation, or incubation temperature. CA-FABP and rat heart-FABP do differ, however, in the physical environment of their binding pockets. (Auth. mod.)

B-55061

Fogelqvist, E., Tanhua, T., **Iodinated C_1-C_4 hydrocarbons released from ice algae in Antarctica,** International Conference on Natural-Produced Halogens, Delft, The Netherlands, 1995.

Edited by A. Grimwall and E.W.B. de Leer, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1995, p.295-305, 15 refs.

DLC QC877.6.N44 1995

As part of an extensive investigation of halocarbons (low molecular weight halogenated hydrocarbons) in the waters of the Weddell Sea in Jan.-Feb. 1993, a set of four brominated and eight iodinated hydrocarbons were measured in sea ice containing algal colonies, and the results were compared with those of surrounding surface seawater. Samples were collected in two ways. On one occasion, brownish ice was taken from underneath an ice floe, and the ice pore water analyzed. On another occasion, samples were collected from colonies living in the interface between the snow and the sea-ice. Some of the latter samples were also analyzed for their content of chlorophyll *a*. In none of the ice algae samples were brominated halocarbons found at concentrations significantly higher than in the surface water, in contrast to the published observations of other workers. Levels of bromocarbon concentrations in ice pore water (from the underside of an ice floe) were only 40-60% of the concentrations in surrounding water collected just under the floe. On the other hand, elevated concentrations of four iodinated compounds were observed in the ice pore water. (Auth. mod.)

B-55062

Kawano, M., Yoshioka, H., Tejima, Y., Tatsukawa, R., **Occurrence of organic halogens in marine mammals,** International Conference on Natural-Produced Halogens, Delft, The Netherlands, 1995. Edited by A. Grimwell and E.W.B. de Leer, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1995, p.333-337, 9 refs.

DLC QC877.6.N44 1995

It is well known that synthetic organochlorine compounds, such as PCBs, DDTs, HCHs and chlordane compounds (CHLs), are widespread in the environment. Their concentrations in higher trophic marine organisms are often higher than those in lower trophic ones. Sometimes marine mammals contain higher concentrations of these organochlorines than terrestrial animals do. Additionally, concern about naturally produced organic halogens has grown during the last decade. Analysis of total extractable organic halogens (TOX) will be of help in understanding the levels of unidentified organic halogens when TOX and identified organic halogen concentrations are compared. In the present study, distribution of TOX and identified synthetic organohalogens in the blubber of some marine mammals are investigated. Various whale, porpoise, and dolphin species were collected from the Bering Sea, North Pacific, Sea of Japan, southern North Pacific, and antarctic ocean areas to participate in this study. (Auth. mod.)

B-55063

O'Loughlin, P.M., O'Hara, T.D., **Review of the genus *Smilasterias* (Echinodermata, Asteroidea), with descriptions of the new species from south-eastern Australia, one a gastric brooder, and a new species from Macquarie Island,** *Museum of Victoria. Memoirs,* Mar. 1990, 50(2), p.307-323, 23 refs.

DLC Q93.V7 1990

An emended diagnosis is provided for the genus *Smilasterias* Sladen. Three new species of *Smilasterias* are described. *S. multipara* sp. nov. and *S. tasmaniae* sp. nov. are endemic to southeastern Australia, and *S. clarkailsa* sp. nov. is from Macquarie I. The seasonal gastric brooding habit of *S. multipara* sp. nov. is described. Descriptions are given for *S. scalprifera* (Sladen), *S. triremis* (Sladen) and *S. irregularis* H.L. Clark. A key to the species of *Smilasterias* and a distribution map for the three southeastern Australian species are provided. (Auth.)

B-55064

Hicks, G.R.F., **New species of *Donsiella* (Copepoda: Harpacticoida) associated with the isopod *Limnoria stephenseni* Menzies from Macquarie Island,** *Museum of Victoria. Memoirs,* Mar. 1990, 50(2), p.451-456, 5 refs.

DLC Q93.V7 1990

A fifth species of *Donsiella* and the first from an algae-boring species of the genus *Limnoria* is described and illustrated. It differs from other donsiellines, *inter alia* by the unique armature of the P1 endopod 2 claws. A key to the genus is presented and notes provided on aspects of the biology of this new species. (Auth.)

B-55094

Kennedy, A.D., **Antarctic terrestrial ecosystem response to global environmental change,** *Annual review of ecology and systematics,* 1995, Vol.26, p.683-704, 131 refs.

DLC QH540.A53 vol.26 1995

Geographical isolation and climatic constraints are responsible for the low biodiversity and structural simplicity of the antarctic terrestrial ecosystem. Under projected scenarios of global change, both limiting factors may be released. Alien species immigration is likely to be facilitated as modified ocean and atmospheric circulation introduce exotic water- and air-borne propagules from neighboring continents. Elevated temperature, UV radiation, CO_2, and precipitation will combine additively and synergistically to favor new trajectories of community development. Uniquely in Antarctica, many of the short-term consequences of global change will depend on the ecophysiological relationships of cryptogamic plants. However, in the long term, climatic warming will favor an increase in phanerogamic biomass since these species are currently excluded by the low cumulative degree-days >0°C. It has been suggested that antarctic communities may be particularly vulnerable to global change: their slow rate of development and restricted gene flow limit response to new conditions. However, vulnerability must be defined with respect to both the direction and rate of change and it is likely that some perturbations will enhance the complexity and productivity of the biota, with negative feedback to the global carbon cycle. (Auth. mod.)

B-55096

Nilsson, S., Forster, M.E., Davison, W., Axelsson, M., **Nervous control of the spleen in the red-blooded antarctic fish, *Pagothenia borchgrevinki*,** *American journal of physiology,* Mar. 1996, 270(3, Pt.2 of 2), p.R599-R604, 33 refs.

The mechanisms of splenic control in an antarctic fish were investigated using isolated spleen and mesenteric artery strips *in vitro* and perfused spleen preparations *in situ.* Splenosomatic index (SSI) and hematocrit were determined in animals treated with atropine and phentolamine. Atropine injection increased the SSI whereas phentolamine decreased SSI. In atropine-injected fish, hematocrit decreased from 18.6 to 6.6 3 h after injection. Electrical stimulation of the splenic nerves produced biphase flow responses. In 11 of 12 tested preparations, atropine abolished the response, suggesting a major cholinergic component in the splenic innervation. Isolated spleen strip preparations contracted in response to carbachol, a response that was antagonized by atropine. The response to acetylcholine was markedly enhanced by a specific cholinesterase inhibitor. Catecholamine effects were somewhat irregular. The results suggest a mainly, if not solely, cholinergic autonomic control of the borch spleen, and a major function of the cholinergic innervation in the control of hematocrit in this species. (Auth. mod.)

B-55098

Boyd, I.L., Reid, K., Bevan, R.M., **Swimming speed and allocation of time during the dive cycle in antarctic fur seals,** *Animal behavior,* Sep. 1995, 50(9), p.769-784, 43 refs.

During sustained bouts of diving, predators such as fur seals may adjust the time they spend diving to maximize the time they can spend foraging and minimize the time spent at the surface between dives. To examine this, swimming speeds and the time allocated to different parts of the dive cycle were measured in 10 adult female antarctic fur seals while they were foraging at sea. Swimming speeds were fastest during the descent and ascent phases of dives with a reduction in speed near the bottom of the dive, when the seals were assumed to be feeding on krill. Time spent at the surface increased as a curvilinear function of dive duration and was influenced by diving swimming speed. This relationship was, on average, close to that predicted by a 1992 model which suggested that the metabolic rate was greatest during the foraging phase of dives rather than during the ascent or descent. Deep diving and high swim speeds also incurred costs in terms of reduced foraging time and may explain why mean dive depths for individuals were within the range of 12-33 m. These data broadly support the predictions of models of diving behavior based on balancing the supply of, and demand for, oxygen and the principle that fur seals are attempting to maximize the time they spend within the foraging area. (Auth. mod.)

B-55099

Prézelin, B.B., Boucher, N.P., Smith, R.C., **Daytime kinetics of UVA and UVB inhibition of photosynthetic activity in antarctic surface waters,** *Current topics in plant physiology,* 1993, Vol.8, Photosynthetic responses to the environment, edited by H.Y. Yamamoto and C.M. Smith, p.150-155, 5 refs.

During the *Icecolors* '90 expedition, the increase in and penetration of UVB radiation into antarctic waters were directly measured, providing the first conclusive evidence of a direct ozone (O_3)-related effect on the productivity of a natural phytoplankton community. Additional *Icecolors* results presented here indicate that 1) the quantum requirement for fractional inhibition of surface primary production by ultraviolet B (UVB) and/or ultraviolet A (UVA) radiation is not constant over the day; 2) phytoplankton photosynthesis is much less susceptible to UVA and UVB photodamage during the middle of the day; and 3) short-term measurements of UVB photoinhibition are higher than those determined for all day incubations, further impacting estimates of the potential carbon loss due to the depletion of stratospheric ozone over Antarctica during the austral spring. (Auth.)

B-55100

Lovelock, C.E., Osmond, C.B., Seppelt, R.D., **Photoinhibition in the antarctic moss *Grimmia antarctici* Card. when exposed to cycles of freezing and thawing,** *Plant, cell and environment,* 1995, Vol.18, p.1395-1402, 33 refs.

When snow cover was removed from moss in the field, resulting in exposure to fluctuating temperatures and light conditions, photoinhibition, measured as a reduction in the ratio of variable to maximum chlorophyll *a* fluorescence (F_v/F_m), was observed. The extent of photoinhibition was highly variable and appeared to be reversible during periods of warmer temperatures. A series of controlled laboratory studies found that the light conditions that prevail between freezing and thawing events influenced the recovery from photoinhibition observed during freezing and thawing, with low light conditions facilitating the greatest rates of recovery. After four cycles of freezing and thawing, recovery from photoinhibition in hydrated moss was achieved within 12 h of transfer to 5°C and 15 μmol quanta/m^2/s. These results favor the hypothesis that photoinhibition observed during freezing represents a protective process involving the down-regulation of photosystem II when photosynthetic carbon assimilation is limited by low temperatures. (Auth. mod.)

B-55101

Poulin, É., Féral, J.P., **Why are there so many species of brooding antarctic echinoids,** *Evolution,* Apr. 1996, 50(2), p.820-830, Refs. p.827-830.

Numerous theories have been proposed to explain the richness of nonpelagic development in most marine invertebrates within the southern ocean. These theories can be grouped into three categories: (1) larval survival, where selection acts on larvae; (2) energy allocation; and (3) dispersal. All of them consider the adaptive significance of brood protecting as the key to the success of this strategy in the Antarctic. However, the adaptive significance of brooding and the evolutionary success of this strategy in the Antarctic must be considered as two separate questions. To consider the problem at an evolutionary level, the consequences of different reproductive strategies on the genetic structure of species and on the long-term evolution of the clade are examined. In the case of echinoids, a clade is particularly well suited to addressing this question. In echinoids, the reduction of larval-stage duration is associated with a decrease in gene flow and consequently in the geographical scale of genetic differentiation. (Auth. mod.)

B-55103

Moreno, J., Sanz, J.J., **Field metabolic rates of breeding chinstrap penguins (*Pygoscelis antarctica*) in the South Shetlands,** *Physiological zoology,* May/June 1996, 69(3), p.586-598, 35 refs.

In a study using doubly labeled water, chinstrap penguins caring for chicks expired on average 2.06-2.44 mL CO_2/g/h, depending on the equation used to calculate CO_2 production from isotope turnover. This is equivalent to 4.0-4.7 times the estimated basal metabolic rate. Energy use while guarding small chicks on the nest was 1.5-1.8 times the basal metabolic rate, and 4.6-5.4 times the basal metabolic rate when foraging at sea. The field metabolic rates measured at sea are similar to those reported for Adélie penguins but higher than those in studies of other penguin species. Adult penguins expired 2.27-3.13 mL CO_2/g/h while foraging for chicks in the guard stage and 2.45-2.60 mL CO_2/g/h while foraging for chicks in the crèche stage. These values are not significantly different. Chicks of 40 d of age had field metabolic rates twice those measured in adults while on land guarding chicks, but similar to those reported for chicks of other penguin species. The authors estimated that an adult in energy balance feeding grown chicks would consume 1.67 kg of fresh krill daily to sustain its energy requirements, while one of its grown chicks would consume 0.53 kg of food daily. That would imply for a breeding adult a 32% increment above the foraging effort required to sustain its own needs. (Auth. mod.)

B-55105

Clarke, A., Johnston, I.A., **Evolution and adaptive radiation of antarctic fishes,** *Trends in ecology and evolution,* May 1996, 11(5), p.212-218, 49 refs.

There are few instances where a knowledge of the thermal physiology, habitats and lifestyles of a group of closely related species can be mapped onto a well-supported phylogeny and a detailed climatic history. The unique fish fauna of the southern ocean, dominated by a single group of fish whose phylogeny is known from traditional and molecular techniques, provides one such opportunity. Furthermore, these fish are living at an extreme temperature for marine organisms. Physiological and molecular studies are revealing details of the mechanisms of temperature compensation and, combined with knowledge of the thermal history, are throwing new light on the process of evolution in this unique group of fish.

B-55106

Stiboy-Risch, C., ***Pentapycnon magnum*, a new species of Pycnogonidae from the Antarctic (Pantopoda, Pycnogonida)** [*Pentapycnon magnum*, eine neue Art der Pyconogonidae aus der Antarktis (Pantopoda, Pycnogonida)], *Bonner Zoologische Beiträge,* Oct. 1994, 45(2), p.147-151, In German with English summary. 2 refs.

DLC QL1.B65

Pentapycnon magnum sp. n., a new species of Pycnogonidae from Antarctica, is described and illustrated. Three female specimens were sampled by dredge near Princess Martha Coast/Weddell Sea and South Georgia during RV *Polarstern* and FRV *Walther Herwig* cruises 1984-85. The depth range of *P. magnum* is 190 m to 429 m. (Auth.)

B-55108

Mackensen, A., Schmiedl, G., Harloff, J., Giese, M., **Deep-sea foraminifera in the South Atlantic Ocean: ecology and assemblage generation,** *Micropaleontology,* Dec. 1995, 41(4), p.342-358, Refs. p.353-355.

Benthic foraminiferal assemblages of 237 high-quality surface sediment samples from the South Atlantic Ocean, including the Atlantic sector of the circumpolar ocean, were quantitatively analyzed. Comparisons between assemblages of live and dead specimens showed that potential fossil assemblages of dead specimens were markedly impoverished in fragile and non-resistant agglutinated forms compared to the living assemblages. The dead material was grouped into nine principal faunal endmembers by multivariate statistics and quantitatively correlated with available environmental variables. This data set is planned to serve as a reference for interpreting benthic foraminifera fluctuations in Pleistocene Southern Atlantic core material and to constrain the reliability of proxies directly derived from benthic foraminiferal shell geochemistry. (Auth. mod.)

B-55109

McMinn, A., **Why are there no post-Paleogene dinoflagellate cysts in the southern ocean,** *Micropaleontology,* Dec. 1995, 41(4), p.383-386, 46 refs.

Dinoflagellates are an important component of antarctic coastal and sea ice communities but comprise only a relatively minor component of southern ocean oceanic phytoplankton assemblages. However, living species capable of producing geologically-preservable cysts have been reported only rarely from antarctic waters and no Quaternary cysts have ever been recovered from southern ocean surface sediments. The youngest fossil dinoflagellate cysts to occur anywhere in the antarctic-southern ocean region are Oligocene and these predate the period of rapid sea-floor spreading and major continental glaciation. This geographic and thermal isolation has prevented the poleward migration of cyst-producing dinoflagellates, which require a continental shelf or slope pathway to migrate. The loss of shallow water shelves from the antarctic continent, due to the isostatic effects of ice accumulation, must have contributed to the local extinction of the Paleogene cyst-forming groups. (Auth. mod.)

B-55110

Oceanites begins Antarctic Site Inventory project, *Geotimes,* Feb. 1996, 41(2), p.10-11.

In 1994, the NSF's Office of Polar Programs awarded a two-year start-up grant to Oceanites, a nonprofit educational and scientific foundation located near Washington, D.C., to conduct an Antarctic Site Inventory project (ASI) and create physical and biological databases upon which the Protocol's environmental impact decisions can be based. ASI's database is expected to help close the information gap. From Nov. 1994 through Feb. 1995, Inventory team members conducted 43 surveys at 20 locations in the Antarctic Peninsula, and established 139 reference sites for censusing penguins, flying birds, and seals. Project researchers also began to establish geologic, glacial, and floral profiles for each location. With the help of hand-held Global Positioning System (GPS) equipment, researchers sketched maps which will enable future teams to return to specific sites for more population counts and cataloging. By mid-Dec. 1995, the number of locations visited by Oceanites teams had climbed from 20 to 25. (Auth. mod.)

B-55119

Ruzicka, J.J., **Comparison of the two alternative early life-history strategies of the antarctic fishes *Gobionotothen gibberifrons* and *Lepidonotothen larseni*,** *Marine ecology progress series,* Mar. 28, 1996, 133(1-3), p.29-41, 62 refs.

Two major early life-history strategies of notothenioid fishes in the lower Antarctic are identified based upon the length of pelagic development: species that complete pelagic development within 1 summer season ('summer larvae') and species with extended pelagic development that continues over winter months ('winter larvae'). These 2 life-history strategies were compared using otolith techniques to reveal growth histories, hatching periods, and development rates of larval *Gobionotothen gibberifrons* (summer larvae) and *Lepidonotothen larseni* (winter larvae) from the Antarctic Peninsula (summer 1986-87) and South Georgia (summers 1987-88 and 1988-89). The hatch period of both species was delayed off the Antarctic Peninsula (late-Nov. to mid-Dec.) compared to South Georgia (early to mid-Nov.), as is the onset of the productive season at higher latitudes. Summer larvae have no growth advantage but do develop more quickly than winter larvae, offering the ability to reduce the time spent in a vulnerable life-history stage. Winter larvae may take advantage of an extended period for growth, using pelagic resources unavailable to summer larvae, or recruiting to the demersal environment when competition from summer recruits is lowest. (Auth. mod.)

B-55149

Tumeo, M.A., Wolk, A.E., **Assessment of the presence of oil-degrading microbes at McMurdo Station,** *Antarctic journal of the United States,* 1994, 29(5), p.375-377, 5 refs.

McMurdo Station, situated next to Winter Quarters Bay, consists of more than 100 structures, including a fuel-storage and transfer system. The existing fuel-storage system includes 18 above-ground steel storage tanks located in 3 tank farms, referred to as Hut Point Tank Farm, Tank Farm 1 and Tank Farm 2. A schematic of the location of the tank farms in relation to major features of McMurdo Station is shown in a figure. McMurdo Station has had numerous reported and suspected fuel releases. Soil analysis data support the theory that due to the abundance of fuel released at McMurdo Station, some form of organism has found its niche and is utilizing this readily available carbon source.

B-55157

Smith, R.I.L., **Introduced plants in Antarctica: potential impacts and conservation issues,** *Biological conservation,* 1996, 76(2), p.135-146, Refs. p.145-146.

The development of and compliance with the code of conduct embodied in the Antarctic Treaty to prevent or minimize the introduction of plants into the Antarctic is outlined. A chronological account of all known experimental and accidental introductions of higher plants in the field and their success and fate, if known, is given. The potential danger to the natural antarctic ecosystem of importing plants rooted in their original soil is discussed with particular regard to the introduction of microorganisms, invertebrates and viable plant propagules. Unintentional dispersal of non-indigenous biota by human activities, and dispersal by natural agents (wind, birds) into and within the Antarctic, is assessed and numerous examples which have contravened the measures of the Antarctic Treaty for the control of introduced biota are noted. The need for strict observance of the new Protocol on Environmental Protection to the Antarctic Treaty is emphasized. (Auth.)

B-55158

Jayatilake, G.S., Thornton, M.P., Leonard, A.C., Grimwade, J.E., Baker, B.J., **Metabolites from an antarctic sponge-associated bacterium, *Pseudomonas aeruginosa*,** *Journal of natural products,* Mar. 1996, 59(3), p.293-296, 27 refs.

In an ongoing survey of the bioactive potential of microorganisms associated with antarctic marine invertebrates, the culture media of a sponge-associated bacterial strain of *Pseudomonas aeruginosa* was found to contain metabolites which inhibit the growth of several Gram-positive microorganisms. A series of diketopiperazines (1-6) including a new natural product (6) and two known phenazine alkaloid antibiotics (7 and 8) were isolated from the culture broth of this bacterium. (Auth.)

B-55161

Pakhomov, E.A., Perissinotto, R., **Antarctic neritic krill *Euphausia crystallorophias*: spatio-temporal distribution, growth and grazing rates,** *Deep-sea research,* Jan. 1996, 43(1), p.59-87, Refs. p.83-87.

Dynamics of distribution, growth, life span and feeding were studied in the endemic antarctic euphausiid *Euphausia crystallorophias* in the central part of the Indian sector of the southern ocean during summers from 1977 to 1990, and in the Lazarev Sea during the summer 1990-91. Both larvae and adult *E. crystallorophias* were found in abundance in shelf waters of 100-500 m depth. Total life span of *E. crystallorophias* may reach 5 years in the Prydz Bay region and 4 years in the Cosmonaut Sea. Analysis of size distribution by sex suggests that male *E. crystallorophias* may have a shorter life span than females. Growth for only 180 d/y is assumed, mean growth rates ranged from 0.070-0.075 to 0.019-0.022 mm per day during the first and the fourth year, respectively. In the Prydz Bay and the Cosmonaut Sea, spawning of *E. crystallorophias* appears to peak from the end of Nov. to early Dec. and may extend to the beginning of Jan. Most larvae were in the stage of metanauplius/calyptopis I at the beginning of Jan. and calyptopis III/furcilia I during Feb. The year-1 cohort was identified in Jan.-Feb. and exhibited a mean length in the range 10.8-15.8 mm. (Auth. mod.)

B-55162

Balushkin, A.V., Voskoboĭnikova, O.S., **Systematics and phylogeny of antarctic dragonfishes (Bathydraconidae, Notothenioidei, Perciformes),** *Journal of ichthyology,* Oct. 1995, 35(5), p.89-104, Translated from Voprosy ikhtiologii 35(2). 15 refs.

Results of a comparative study of the skeleton, lateral-line system, and external morphology of antarctic dragonfishes are presented. A hypothesis of the phylogenetic relationships of the genera is proposed and their overall similarity estimated using phylogenetic and phenetic analyses. A new classification of the supraspecific taxa of the family is developed. The antarctic dragonfishes are divided into two subfamilies: Gymnodraconinae Andriashev, 1973 (2 genera), and Bathydraconinae Regan, 1914 (8 genera), with the latter including the tribes Bathydraconini (5 genera) and Parachaenichthyini tr. nov. (genera *Cygnodraco* Waite, *Gerlachea* Dollo, and *Parachaenichthys* Boulenger). (Auth.)

B-55163

Miller, W.R., Miller, J.D., Heatwole, H., **Tardigrades of the Australian Antarctic Territories: The Windmill Islands, East Antarctica,** *Linnean Society of London. Zoological journal,* Jan.-Feb. 1996, 116(1-2), p.175-184, Refs. p.183-184.

Six species of tardigrades, *Pseudechiniscus suillus, Macrobiotus* sp., *Hypsibius antarcticus, Ramajendas frigidus, Diphascon chilenense* and *Diphascon pingue* were extracted from mosses and lichens from the ice-free regions of the Windmill Is. near Casey Base, East Antarctica. Significant positive associations were found among the three common species *(P. suillus, H. antarcticus, D. chilenense)* and bryophytes, whereas strong negative associations were found between these species and algae and lichens. There were additional interspecific associations among the common species of tardigrades as well as among tardigrades, nematodes and rotifers. (Auth.)

B-55186

Wiencke, C., **Recent advances in the investigation of antarctic macroalgae,** *Polar biology,* Apr. 1996, 16(4), p.231-240, Refs. p.237-240.

The paper summarizes the present knowledge of antarctic macroalgae with regard to the following topics: explorative history of antarctic macroalgae, the environment of macroalgae in the Antarctic, life histories and physiological anatomy, seasonal development, light demands and depth zonation, temperature demands and geographical distribution and the effect of desiccation, salinity and temperature on supra- and eulittoral algae. A baseline is visible, but much more work is necessary, especially to assess the susceptibility of macroalgae and coastal ecosystems in Antarctica to global climatic changes. (Auth.)

B-55187

Ronayne de Ferrer, P.A., Gonzalez Colaso, R.A., Marquez, M.E.I., Carlini, A.R., Vergani, D.F., Daneri, G.A., **Southern elephant seal *(Mirounga leonina).* II. Studies of milk protein fractions by gel electrophoresis,** *Polar biology,* Apr. 1996, 16(4), p.241-244, 21 refs.

Milk protein fractions during various stages of lactation in the southern elephant seal were analyzed. Twelve milk samples were taken from ten females throughout the lactation period during 1990 and 1991 at Stranger Point. Milk samples were subjected to polyacrylamide gel electrophoresis (PAGE). Samples from different days of lactation gave similar qualitative electrophoretic patterns. True protein content was significantly higher ($P<0.05$) at the beginning of lactation, and then remained constant until weaning. Caseins and whey proteins each consisted of several protein entities (four and five distinct bands respectively). Casein constituted only about 30% of the protein nitrogen, the remaining 70% being derived from whey proteins. There was some variation in concentration of casein and whey proteins as a function of time ($P<0.05$). (Auth.)

B-55188

Convey, P., Greenslade, P., Richard, K.J., Block, W., **Terrestrial arthropod fauna of the Byers Peninsula, Livingston Island, South Shetland Islands—Collembola,** *Polar biology,* Apr. 1996, 16(4), p.257-259, 8 refs.

As an addendum to a recent publication on the terrestrial arthropod fauna of the Byers Peninsula Site of Special Scientific Interest (SSSI), which included preliminary identification of four Collembola, the authors now present detailed information on Collembola occurring within the SSSI. Five species were recorded *[Friesea grisea* (Schaffer), *Tullbergia mixta* Wahlgren, *Isotoma (Folsomotoma) octooculata* (Willem), *Cyptopygus antarcticus* Willem, and *Cryptopygus* sp. nov.]. Species occurrence and abundance differed between samples collected from poorly vegetated stony ground and vegetation cores. *F. grisea* was both the commonest (58% of individuals) and the most widely distributed (18-19 samples) in the former habitat. *Cryptopygus* sp. nov. was recorded only in the vegetation core samples. All five species were more evenly distributed in vegetation samples, although *C. antarcticus* and *Cryptopygus* sp. nov. were again the least abundant. A list of the terrestrial arthropods of the SSSI is presented. (Auth.)

B-55189

Pakhomov, E.A., McQuaid, C.D., **Distribution of surface zooplankton and seabirds across the southern ocean,** *Polar biology,* Apr. 1996, 16(4), p.271-286, Refs. p.285-286.

Surface zooplankton and seabird densities and community composition in the South Atlantic are described and related to oceanographic features. Samples were collected during two return voyages aboard the MV *Benjamin Bowring* as part of the Transglobe Expedition (1979-1981). High abundances of surface zooplankton and seabirds were consistently observed within the main frontal systems of the southern ocean. Generally, on a mesoscale, significant correlations between surface temperature and the distribution of zooplankton or seabirds were observed. On a macroscale, the geographical positions of the zooplankton and seabird communities coincided with specific water masses. The results of this study suggest that appropriate food availability rather than water temperature is important for the determination of seabird distribution. The ecological importance of the recently described frontal zone associated with the northern boundary of the maximum winter expansion of sea ice is confirmed by biological data obtained in this study. (Auth.)

B-55190

Marshall, D.J., **Comparative water relations of sub-Antarctic and continental Antarctic oribatid mites,** *Polar biology,* Apr. 1996, 16(4), p.287-292, Refs. p.291-292.

Water availability, in addition to cold, is important in limiting biotic distribution in the antarctic regions. In general, inland continental antarctic habitats are dry, compared to maritime and subantarctic habitats. This investigation compares the water relations of an endemic continental antarctic oribatid mite, *Maudheimia petronia* Wallwork, and two subantarctic oribatid mites, *Halozetes fulvus* Engelbrecht and *Podacarus auberti* Grandjean. *M. petronia* showed enhanced survival of dehydrating conditions, which may be attributable to both its greater resistance to and tolerance of water loss. Data suggest physiological adaptation by *M. petronia* for existence in periodically dry "chalikosystem" habitats at antarctic nunataks. Comparisons of tolerance of submersion in fresh water showed *P. auberti* to be superior to *M. petronia.* Tolerance of submersion by *P. auberti* may be important for its existence in wet subantarctic habitats. Conversely, the poor tolerance shown by *M. petronia* suggests that this mite has not been associated with moist environments. (Auth. mod.)

B-55191

McMinn, A., **Preliminary investigation of the contribution of fast-ice algae to the spring phytoplankton bloom in Ellis Fjord, eastern Antarctica,** *Polar biology,* Apr. 1996, 16(4), p.301-307, Refs. p.306-307.

Algae released from fast-ice in Ellis Fjord make little contribution to subsequent phytoplankton growth. Dominant taxa in the interior ice community included *Nitzschia cylindrus* (Grun) Hasle, *Navicula glaciei* V.H. and a dinoflagellate cyst. Diatom mortality within the ice was high. The algal contribution to the phytoplankton from the fast ice was estimated by calculating the difference between algal biomass in ice cores taken on Nov. 14 with those taken on Dec. 18, 1992. The low contribution from the fast-ice of Ellis Fjord to the phytoplankton is similar to results from other antarctic fast-ice communities but is not necessarily reflective of processes occurring within either antarctic or arctic pack ice communities. An algal mat growing on the base of the fast-ice had a carbon standing crop of between 0.231 gC/m^2 and 0.022 gC/m^2. Much of this was delivered to the water column as the ice melted, while the remainder was exported. (Auth. mod.)

B-55194

Tarling, G.A., Ward, P., Sheader, M., Williams, J.A., Symon, C., **Distribution patterns of macrozooplankton assemblages in the southwest Atlantic,** *Marine ecology progress series,* Apr. 20, 1995, 120(1-3), p.29-40, 57 refs.

A zooplankton net sampling survey was conducted in the southwest Atlantic between 34° and 55°S during austral spring 1990. The survey grid covered shelf, slope and oceanic regions and contained 44 stations spaced at 100-200 km intervals. Sampling was carried out with an RMT8 net which was deployed obliquely from the surface to either 200 m over shelf regions or 300 m off-shelf. A total of 155 species were identified from 9 taxonomic groups including euphausiids, hyperiid amphipods, chaetognaths, salps, siphonophores and nektonic/planktonic fish. Log-transformed relative numerical abundances for each species were used in hierarchical classification to elucidate macroscale patterns of distribution. Factor analysis was also used on the most abundant and widely distributed species to reveal mesoscale patterns. Classification analysis produced 4 station groups which showed distinct geographic integrity and strong relationships to the positions of water masses. Group 1 was related to the Falkland shelf, Group 2, the Polar Frontal Zone (PFZ), Group 3, the subantarctic water mass (SAZ) and Group 4, the subtropical water mass (STZ). Overall it was evident that there was a strong correspondence between the distribution of faunal groups and water masses. (Auth. mod.)

B-55195

Palsbøll, P.J., et al, **Distribution of mtDNA haplotypes in North Atlantic humpback whales: the influence of behaviour on population structure,** *Marine ecology progress series,* Jan. 12, 1995, 116(1-3), p.1-10, 43 refs.

Samples from 136 humpback whales, representing 5 feeding aggregations in the North Atlantic and 1 in the Antarctic, were analyzed with respect to the sequence variation in the mitochondrial (mt) control region. A total of 288 base pairs was sequenced by direct sequencing of asymmetrically amplified DNA. Thirty-one different haplotypes were identified. The nucleotide diversity for the total sample was estimated to be 2.6%, which is high relative to other North Atlantic cetaceans. The degree of genetic differentiation in various subsets of the samples was estimated and tested for statistical significance by Monte Carlo simulations. Significant degrees of heterogeneity were found between the Antarctic and all North Atlantic areas, as well as between Iceland and the western North Atlantic samples. A genealogical tree was estimated for the 31 haplotypes and rooted with the homologous sequence from a fin whale. The combined results from the homogeneity tests and the genealogical tree indicate that behavior can influence the population structure of marine cetaceans on an evolutionary time scale. The antarctic samples provide an outgroup as a frame of reference for interpreting the North Atlantic samples. (Auth. mod.)

B-55197

Arnould, J.P.Y., Boyd, I.L., Socha, D.G., **Milk consumption and growth efficiency in antarctic fur seal (*Arctocephalus gazella*) pups,** *Canadian journal of zoology,* Feb. 1996, 74(2), p.254-266, 75 refs.

The body composition, milk consumption, and growth efficiency of antarctic fur seal pups were measured over three consecutive lactation periods (1990-92) at Bird I., South Georgia. The body composition of pups differed between the sexes; whereas for any given age females were lighter than males, they had proportionately higher body lipid reserves than males. Milk consumption was determined on 388 occasions in 177 pups. Mean estimates of milk consumption ranged from 2.5 to 3.2 kg during the 6-day perinatal period and from 2.9 to 3.6 kg during the 1- to 2-day maternal attendance periods (feeding bouts). There were no differences in milk consumption between the sexes in any year. Both per-bout and per-day milk consumption increased steadily with age before decreasing significantly in the last 30-40 days of lactation. Per-bout milk consumption was positively related to the duration of the maternal foraging trip and attendance cycle, and both per-bout and per-day milk consumption were related to pup mass. Pups of both sexes consume the same amount of milk, but males direct more of their milk consumption into lean tissue growth than females, which accumulate greater adipose stores. Therefore, mass and mass changes may not be appropriate parameters for investigating differential maternal investment between the sexes in otariid pups. (Auth.)

B-55198

Chandrasekar, B., Troyer, D.A., Venkatraman, J.T., Fernandes, G., **Tissue specific regulation of transforming growth factor Beta by Omega-3 lipid-rich krill oil in autoimmune murine lupus,** *Nutrition research,* Mar. 1996, 16(3), p.489-503, 48 refs.

It has been previously reported that hybrid New Zealand female mice [(NZBxNZW) F_1 or B/W] fed a diet enriched in ω-3 lipid-rich fish oil vs. ω-6 lipid-rich corn oil show delayed development of autoimmune lupus nephritis and longer life span. The present study was carried out to explore the possible beneficial effects of oil from antarctic krill as an alternative source of ω-3 lipids. Weanling B/W mice were fed a nutritionally adequate semipurified diet supplemented with either 10% (wt/wt) krill oil (KO) or corn oil (CO). Cross-sectional studies were carried out on kidneys and spleens at 3.5 and 6.5 months of age. The authors' results indicate that KO prolonged life span (CO, 266.7 days; KO, 330.2 days; $P<0.001$) and delayed the onset of proteinuria. Details of the experiment are given. (Auth. mod.)

B-55199

Poulin, É., Féral, J.P., **Pattern of spatial distribution of a brood-protecting schizasterid echinoid, *Abatus cordatus*, endemic to the Kerguelen Islands,** *Marine ecology progress series,* Mar. 9, 1995, 118(1-3), p.179-186, 36 refs.

This study examined the spatial distribution at different geographic scales of the echinoid *Abatus cordatus* which is endemic to the Kerguelen Is. Special attention was paid to the nondispersal strategy of the species. It lives burrowed in the sediment and females brood their young in dorsal pouches. The dispersal of this species is therefore characterized by a limited mobility among adults and the lack of a free-swimming larval phase. Using scuba and dredging, *A. cordatus* was sampled all around Kerguelen. The spatial distribution from the island scale to the bay scale shows discontinuities at 2 levels: (1) at the island level favorable sectors (principally characterized by jagged coastline with numerous sheltered bays) are separated by linear coastline or swell exposed sectors; (2) at the bay scale *A. cordatus* lives in high density, isolated demes in shallow water of sheltered bays. *A. cordatus* was most numerous in sediments that ranged from medium to fine sand. The granulometry of the sediment and the lack of predation determine this aggregated spatial distribution pattern. (Auth. mod.)

B-55202

Longton, R.E., **Bryophyte vegetation in polar regions,** Bryophyte ecology. Edited by A.J.E. Smith, London, Chapman and Hall, 1982, p.123-165, Refs. p.161-165.

DLC QK533.6.B78 1982

Bryophyte vegetation is compared in the Arctic and Antarctic. Analogies are suggested in wetland, mesic, and polar desert plant communities for both polar regions. The dominant species and habitats of bryophyte communities in the maritime Antarctic, continental Antarctica, and subantarctic islands, are described. It is noted that bryophyte communities grow luxuriantly in continental antarctic lakes at depths up to 10 m where the corresponding terrestrial vegetation is sparse.

B-55207

Dobson, S.J., James, S.R., Franzmann, P.D., McMeekin, T.A., **Numerical taxonomic study of some pigmented bacteria isolated from Organic Lake, an antarctic hypersaline lake,** *Archives of microbiology,* 1991, 156(1), p.56-61, 36 refs.

A study was made of a group of moderately halophilic, heterotrophic, pigmented strains isolated from Organic Lake. These strains were Gram-negative, non-motile, had an aerobic metabolism and a mol% G+C content of their DNA in the range of 35-41, indicating that they may be members of the *Flavobacterium-Cytophaga* group. A numerical taxonomic study involving 134 characteristics compared the antarctic strains with reference strains from *Flavobacterium, Cytophaga* and *Flectobacillus.* The antarctic strains formed two clusters that did not contain any reference strains, suggesting that they may represent two new species of the genus *Flavobacterium.* (Auth.)

B-55209

Franzmann, P.D., Höpfl, P., Weiss, N., Tindall, B.J., **Psychrotrophic, lactic acid-producing bacteria from anoxic waters in Ace Lake, Antarctica; *Carnobacterium funditum* sp.nov. and *Carnobacterium alterfunditum* sp. nov.,** *Archives of microbiology,* 1991, 156(4), p.255-262, 44 refs.

Heterofermentative, lactic acid-producing, gram-positive, motile bacteria were isolated from the waters of Ace Lake. All strains produced virtually only L(+)lactic acid from D(+)glucose. D(-)ribose was fermented to lactic, acetic and formic acids, and ethanol. Cell walls contained meso-diaminopimaleic acid. The strains did not grow at 30°C and were psychrotrophic. At 20°C, the strains grew better anaerobically than aerobically and all strains lacked catalase, oxidase and respiratory lipoquinones. DNA that coded for most of the 16S rRNA gene of one of the strains was amplified by the polymerase chain reaction and sequenced. The strain was phylogenetically most closely related to *Carnobacterium mobile.* The isolates separated into two phenotypes. DNA/DNA homology studies determined on a representative from each phenotype showed low homology between the phenotypes and with *C. mobile. Carnobacterium funditum* sp. nov. produced acid from mannitol, trehalose, but not amygdalin. *Carnobacterium alterfunditum* sp. nov. produced acid weakly from amygdalin but not from mannitol or trehalose. The G+C content was 33-34%, and the Type strain is DSM 5972 (=ACAM 313). (Auth. mod.)

B-55213

Carpenter, S.J., Lohmann, K.C., **$\delta^{18}O$ and $\delta^{13}C$ values of mod-**

ern brachiopod shells, *Geochimica et cosmochimica acta,* Sep. 1995, 59(18), p.3749-3764, 65 refs.

Researchers have not rigorously tested the hypothesis that calcite from modem brachiopod shells is precipitated in oxygen isotope equilibrium with ambient seawater. Isotopic variability at the intraspecimen and intertaxon levels has not been examined. Without such data for modem brachiopods, similar data from ancient brachiopods cannot be accurately interpreted. In this study, a survey is made of δ^{18}O and δ&T13C values of Terebratulid, Rhynchonellid, Thecideidine, and Craniacean brachiopods from Antarctica, the Bay of Fundy, Curacao, Japan, New Zealand, Norway, Puget Sound, Palau, Sicily, and South Africa. Modern brachiopods occur in a wide range of seawater salinities and temperatures. Therefore, the relation between salinity and the δ^{18}O value of seawater must be known to correctly calculate the temperature of calcite precipitation from secondary layer δ^{18}O values. Errors of up to 15°C are found if ambient seawater is assumed to have a constant δ^{18}O (e.g., 0 per mill SMOW) and the δ^{18}O values of secondary layer calcite are used to calculate temperature. Coupled with "vital" effects and intraspecimen variability, these errors can obscure the resolution of secular variations in the rock record. (Auth. mod.)

B-55215

Gleitz, M., Kukert, H., Riebesell, U., Dieckmann, G.S., **Carbon acquisition and growth of antarctic sea ice diatoms in closed bottle incubations,** *Marine ecology progress series,* May 17, 1996, 135(1-3), p.169-177, 35 refs.

Mixed cultures of 4 polar diatoms regularly found in antarctic pack ice were grown over 20 d in closed bottles at high light and at 0°C in order to investigate growth physiology and biomass production under conditions simulating the sea ice habitat during summer. Slight increases in cell number were observed for all species 2 d later. Peak biomass amounted to 140 micro-g chl *a*. The data confirm that intense photosynthetic carbon assimilation may lead to profound chemical changes in isolated interstitial brine solutions, with significant consequences for sea ice biota. The capacity to efficiently utilize ambient DIC, possibly mediated by virtue of favorable surface to volume ratios as well as active pathways of inorganic carbon acquisition, favors growth of small diatoms, and may be an important factor driving ice algal species succession during summer blooms. Since only 2 species continued to grow in fresh medium following experimental incubation, differential tolerance to chemical variations may influence the seeding potential of ice algae following release into the open water. (Auth. mod.)

B-55216

Archer, S.D., Leakey, R.J.G., Burkill, P.H., Sleigh, M.A., Appleby, C.J., **Microbial ecology of sea ice at a coastal antarctic site: community composition, biomass and temporal change,** *Marine ecology progress series,* May 17, 1996, 135(1-3), p.179-195, 73 refs.

The coastal sea ice in the vicinity of Davis Station supports a diverse microbial community which varies in composition and biomass in response to increasing insolation and temperature during the austral summer. To understand more fully the fate of photosynthetically fixed carbon in sea ice, the dynamics of community composition, biomass and production in autotrophs, heterotrophic protozoa and bacteria were examined. The microbial community inhabiting the bottom few centimeters of landfast ice differed markedly from the interior communities in taxonomic composition and biomass and in the timing and fate of production. Total microbial biomass integrated throughout the ice depth declined during the season from a mean of 1150 mg C/m^2 on Nov. 17 to 628 mg C/m^2 by Dec. 22. In contrast, the biomass of the interior ice community increased during summer and was dominated by autotrophic forms <20 μm in length with a small dinoflagellate, *Gymnodinium* sp., becoming particularly abundant. Bacterial biomass varied by several orders of magnitude between ice depths, mainly due to the occurrence of an abundant population of large epiphytic bacteria in the bottom ice. (Auth. mod.)

B-55221

Hewitt, R.P., Demer, D.A., **Lateral target strength of antarctic krill,** *ICES journal of marine science,* Apr. 1996, 53(2), ICES International Symposium, Aberdeen, Scotland, June 12-16, 1996. Vol.202. Proceedings. Fisheries and plankton acoustics, p.297-302, 21 refs.

An area of high krill density off Elephant I. was continuously monitored with down-looking and side-looking sonars over a period of 24 h. Measurements of volume backscattering strength were used to describe the density of krill with depth and the vertical movement of krill over time. *In situ* measurements were made of dorsal aspect target strength (TS) and, as krill moved into the near-surface layer (0-15 m), *in situ* measurements were made of lateral-aspect TS. The probability density function (PDF) of TS measurements made with the down-looking transducer had a mode at approximately -73 dB. The PDF of TS measurements made with the side-looking transducer was broader with a mode at approximately -67 dB. Sampled krill had a bi-modal length distribution with a major mode at 44 mm and a minor mode at approximately 30 mm. (Auth. mod.)

B-55222

Murray, A.W.A., **Comparison of geostatistical and random sample survey analyses of antarctic krill acoustic data,** *ICES journal of marine science,* Apr. 1996, 53(2), ICES International Symposium, Aberdeen, Scotland, June 12-16, 1996. Vol.202. Proceedings. Fisheries and plankton acoustics, p.415-421, 16 refs.

Data from acoustic surveys of MV SA *Agulhas* and FRV *Walther Herwig,* and the 1981 RRS *John Biscoe* South Georgia acoustic survey were analyzed by geostatistical methods. Estimates of mean density (g/m^2) of krill and their variances are compared with published results from statistical analyses based on random sampling theory. A further high-resolution geostatistical analysis of the *Agulhas* (ping-by-ping) data set of the density of each individual aggregation is also presented. These analyses illustrate the problems of applying geostatistical methods to data from highly aggregated species which can show marked skewness in their histogram of density. (Auth. mod.)

B-55225

Jayatilake, G.S., Baker, B.J., McClintock, J.B., **Isolation and identification of a stilbene derivative from the antarctic sponge *Kirkpatrickia variolosa*,** *Journal of natural products,* Dec. 1995, 58(12), p.1958-1960, 17 refs.

The antarctic red sponge *Kirkpatrickia variolosa* yielded a new stilbene derivative, resveratrol triacetate (3,4',5-triacetoxystilbene, 1), in addition to a known variolin alkaloid. The isolation, characterization, and unambiguous assignments of the ^{1}H- and ^{13}C-nmr spectra of 1 are reported. (Auth.)

B-55229

Jouventin, P., Barbraud, C., Rubin, M., **Adoption in the emperor penguin, *Aptenodytes forsteri*,** *Animal behavior,* 1995, 50(4), p.1023-1029, 25 refs.

Adoption in the emperor penguin was investigated to determine its rate of occurrence, biological causes and adaptive value. The study was carried out over 2 years in Adélie Coast. Adoption was relatively common: 351 cases were recorded out of 2068 chicks in the colony in 1993. Adoption occurred after kidnapping (53%, N=185) of a chick or with the brooding of a chick found wandering in the colony. Long-lasting adoptions were rare (2.3%) and most lasted only 0.5-10 days. Adopted chicks were 1-2 months old. Allofeeding occurred in a minimum 14.8% (N=52) of adoptions in 1993. Alloparents were failed breeders and non-breeding adults at the colony during the breeding cycle and were usually females. Chicks may benefit from being allofed and protected when winters are particularly harsh and more alloparents are available. However, alloparenting may be particularly explained by proximal causes, such as endocrinological mechanisms allowing the birds to be exploited by chicks soliciting food or brooding. (Auth.)

B-55235

Matallanas, J., **Fish taken during the "Antártida 86 11" expedition** [Peces capturados durante la campaña "Antártida 86 11"], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.48-52, In Spanish with English summary. 29

refs.

DLC G845.S93

Twenty-two fish species belonging to 12 families collected during the "Antártida 8611" cruise are described. Taxonomic problems of some antarctic fishes are reviewed and the range of distribution of *Harpagifer georgianus georgianus, Muraenolepis marmoratus, Histiodraco velifer* and *Melamphaes microps* is extended. (Auth.)

B-55236

García Santamaría, M.T., Balguerias Guerra, E., **Age and growth of *Notothenia gibberifrons* Lönnberg 1905 at South Georgia** [Edad y crecimiento de *Notothenia gibberifrons* Lönnberg 1905, en Georgia del Sur], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.53-60, In Spanish with English summary. 15 refs.

DLC G845.S93

During the "Antártida 86 11"cruise, 104 fishing operations were conducted around South Georgia resulting in a catch of *Notothenia gibberifrons* of 533 kg. From these, 322 specimens were selected for age determination by direct analysis of scale samples. The growth parameters were calculated by fitting the mean length at age to the Von Bertalanffy's growth function. (Auth. mod.)

B-55237

Balguerias Guerra, E., Quintero Pérez, M.E., **Distribution, abundance and biology of *Patagonotothen brevicauda guntheri* from the Shag Rocks** [Algunos datos sobre la distribución, abundancia y biología de *Patagonotothen brevicauda guntheri* (Norman, 1937) en Shag Rocks], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.61-73, In Spanish with English summary. 16 refs.

DLC G845.S93

During the Spanish antarctic cruise "Antartida 86 11", 29 fishing operations were conducted around the Shag Rocks. The total catch of *Patagonotothen brevicauda guntheri* was close to 10 tons. Qualitative and quantitative analyses of the catches on a haul by haul basis provided information about the horizontal and bathymetric distribution of this species at the time of the cruise. Its mean abundance by depth strata and for the whole area was also calculated by the swept-area method. Sampling of the length frequency distribution and some essential biological parameters of the species include sex-ratio, length at first maturity, length-weight relationship and length at first capture. (Auth.)

B-55238

Munilla Leon, T., **Two new species of antarctic pycnogonida** [Dos nuevas especies de picnogónidos antárticos], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.74-79, In Spanish with English summary. 11 refs.

DLC G845.S93

Two new species of pycnogonida, collected by bottom trawls in the Scotia Sea during the "Antártida 86 11" expedition, are described and illustrated. *Ammothea sextarticulata* has six joints in its palps, and *Pycnogonum paragaini* presents a conical truncated proboscis and a length/width propodial relation close to 3. (Auth. mod.)

B-55241

Sancho, L.G., Kappen, L., Schroeter, B., **Flora and lichen vegetation of Livingston I.** [Primeros datos sobre la flora y vegetación liquénica de isla Livingston (islas Shetland del Sur, Antártida)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.94-99, In Spanish with English summary. 13 refs.

DLC G845.S93

During the Spanish Antarctic Expedition of 1988-89 to Livingston I. more than 500 lichen specimens were collected. Examination of these specimens has so far yielded 72 specific taxa. Some species, such as *Fuscidea asbolodes, Buellia latemarginata, Carbonea assentiens, Umbilicaria aprina, Usnea sphacelata* and others are new and interesting records for the South Shetland Is. *Umbilicaria nylanderiana* is reported here for the first time from Antarctica. A list of the dominant lichen communities recognized in the study area is also provided. (Auth.)

B-55242

Kappen, L., Schroeter, B., Sancho, L.G., **Lichen ecophysiology and in-situ photosynthesis of crustose lichens** [Investigaciones ecofisiológicas en líquenes antárticos. Primeros datos sobre la actividad fotosintética de líquenes crustáceos "in situ"], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.100-104, In Spanish with English summary. 10 refs.

DLC G845.S93

Since 1979, a research team from the University of Kiel has been studying the ecophysiology of antarctic lichens. An overview of the main results of this study is presented here. In the Spanish Antarctic expedition to Livingston I., photosynthesis and respiration in crustose lichens were measured for the first time under natural conditions. The results obtained for *Lecidea sciatrapha* and *Caloplaca sublobulata* are discussed in relation to their natural habitats in Antarctica and their worldwide distribution.

B-55243

Schroeter, B., Kappen, L., Sancho, L.G., **In situ measurements of the microclimate and net photosynthesis of *Usnea antarctica* from Livingston I.** [Microclima y fotosíntesis neta de *Usnea antarctica* a partir de mediciones realizadas "in situ" en isla Livingston (islas Shetland del Sur, Antártida)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.105-108, In Spanish with English summary. 9 refs.

DLC G845.S93

Usnea antarctica is one of the most abundant species in the lichen tundra of maritime Antarctica. In Feb. 1989, microclimatic conditions and net photosynthesis were measured *in situ* on Livingston I. The net photosynthetic performance of *U. antarctica* in relation to light, temperature and water content of the thallus is presented in a three-dimensional model. The results are compared with laboratory experiments. (Auth.)

B-55244

Curt Martínez, J., Fernández Riestra, A., ***Phalacrocorax atriceps carunculatus* nesting colony in Paradise Harbor** [Notas acerca de una colonia de nidificación de Cormoran carunculado del Antártico *(Phalacrocorax atriceps)* en Bahía Paraíso (península Antártica)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.109-111, In Spanish with English summary. 8 refs.

DLC G845.S93

Two cormorant sites of 60 and 122 individuals, respectively, and a colony of nesting *Phalacrocorax atriceps carunculatus* comprising 59 adult birds and 46 chicks, distributed in 30 nests, were studied in Paradise Harbor in Jan. 1989. Egg measurements, indices of reproduction, and behavioral analysis of the only predator observed in the colony, *Chionis alba,* are presented along with some taxonomic and nutritional observations.

B-55245

Curt Martínez, J., **Observation of 5 Blacknecked swans *Cygnus melanocoryphus* in West Antarctica** [Observación de cinco cisnes de cuello negro *(Cygnus melanocoryphus)* en la zona del Tratado Antártico], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.112-114, In Spanish with English summary. 11 refs.

DLC G845.S93

Observation from the B.O. *Las Palmas*, cruising in west antarctic waters in the summer of 1988-1989, of Blacknecked swans is reported: one in Paradise Harbor, 3 on Deception I., and one on Livingston I. Dates, coordinates and characteristics of the observation points are given, and some migratory aspects are considered. The relevant bibliography is reviewed.

B-55246

Curt Martínez, J., **Cetaceans, seals and seabirds observed around the Shetland Is. and the Antarctic Peninsula in Jan. and Mar. 1989** [Catálogo de cetáceos, pinnípedos y aves observados desde el buque oceanográfico "Las Palmas" durante las navegaciones efectuadas en la zona del Tratado Antártico, y en sus destacamentos de las islas Shetland del Sur y estrecho del Bransfield (25-1-89 a 1-3-89)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.115-119, In Spanish with English summary. 6 refs.

DLC G845.S93

Observations carried out from the B.O. *Las Palmas*, cruising around the Shetland Is. and along the Antarctic Peninsula between Jan. 25 and Mar. 1, 1989, resulted in the compilation of a faunistic catalogue of the area, recording 3 cetaceans, 5 seals and 15 seabirds. It is pointed out that only a few species, although with a high number of individuals each, are distributed in the studied area.

B-55248

Rovirosa, J., Sánchez, I., Palacios, Y., Darias, J., San Martín, A., **Antimicrobial activity of a new monoterpene of the *Plocamium cartilagineum* from the Antarctic Peninsula** [Actividad antimicrobiana de un nuevo monoterpeno del *Plocamium cartilagineum* de la península Antártica], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.128-130, In Spanish. 7 refs.

DLC G845.S93

In the course of investigations of the chemistry of natural products in antarctic marine organisms, 3 polyhalogenated monoterpenes of the red algae *Plocamium cartilagineum* from the Antarctic Peninsula were isolated and their antimicrobial activity was determined against 12 organisms. Results are discussed and presented in a table.

B-55249

Bozal, N., Loren, J.G., Guinea, J., **Taxonomy of bacteria from the Livingston I. isolated during the 1986-1987 expedition** [Aspectos taxonómicos de bacterias aisladas en la isla de Livingston durante la campaña 1986-87], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.131-134, In Spanish with English summary. 11 refs.

DLC G845.S93

A bacteriological study on water samples and sediments from Livingston I. resulted in the isolation of 22 bacterial strains. The majority are Gram negative rods and oxidase positive, some of them showing a coccobacillary morphology. In general all of the strains showed a limited capacity to use carbohydrates. Among the isolated strains, a Gram negative rod was observed which is an interesting chromogenical bacterium producing a hexopolymer protein. A coccus giving a Gram negative reaction, which shows a bacterial envelope structure corresponding to Gram positive microorganisms, was also isolated. (Auth. mod.)

B-55277

Perissinotto, R., Pakhomov, E.A., **Gut evacuation rates and pigment destruction in the antarctic krill *Euphausia superba*,** *Marine biology,* Mar. 1996, 125(1), p.47-54, 44 refs.

Krill grazing data collected during cruises in the region of the Antarctic Polar Front (S.A. *Agulhas* Voyage 70) and the South Georgia shelf (R.V. *Africana* Voyage 119) during the austral summer of 1993 were analyzed to estimate the variability of crucial parameters of the gut fluorescence technique in relation to food availability and krill feeding history. Gut evacuation rates (k) and passage or throughput times (1/k) were strongly correlated to krill feeding activity (estimated as initial gut pigment content) but not to ambient chlorophyll *a* concentration. A significant difference was found when k values derived from incubations in filtered seawater and low charcoal particle concentrations were compared with values derived from krill fed high concentrations of charcoal. The efficiency of gut pigment destruction was among the highest recorded for zooplankton organisms, 58.1 to 98.4%, and did not covary significantly with ambient food concentration. However, the pigment lost per individual krill was strongly correlated with the total amount of pigment ingested. Both gut evacuation rates and pigment destruction efficiency may be realistically estimated only when krill is allowed to continue ingesting particles uninterruptedly. (Auth. mod.)

B-55279

Cruwys, E., Davis, P.B., **Moulting juvenile male southern elephant seals *Mirounga leonina* (L.) at Hannah Point, Walker Bay, Livingston Island, South Shetland Islands,** *Polar research,* Dec. 1995, 14(3), p.329-333, 17 refs.

Southern elephant seals were counted at seventeen discrete moulting sites at Hannah Point, Walker Bay on Livingston I. in the South Shetland Is. between Jan. 2 and Feb. 16, 1994. The physical characteristics of each moulting site were assessed. Counts through 46 consecutive days demonstrated that the number of juvenile males in dry moulting sites increased as the muddy wallows were gradually abandoned. This pattern of behavior is similar to that described for other sex- and age-groups (e.g. adult females) in previous studies. (Auth.)

B-55280

Pakhomov, E.A., Perissinotto, R., McQuaid, C.D., **Prey composition and daily rations of myctophid fishes in the southern ocean,** *Marine ecology progress series,* Apr. 25, 1996, 134(1-3), p.1-14, 75 refs.

The feeding ecology of myctophids was studied using data collected during 5 South African scientific cruises to the southern ocean from 1985 to 1995. A total of 362 specimens, comprising 36 species, were analyzed for gut contents. Peak biomass levels were associated with the main frontal zones and with a permanent polynya region in the Lazarev Sea. Results show that all myctophid species are opportunistic mesozooplankton feeders exhibiting a high degree of overlap in their food spectrum and consuming primarily the most abundant species of copepods, euphausiids, hyperiids and pteropods. Generally, the daily food intake was equivalent to 0.5 (lower mean) to 2.9 (upper mean) of dry body weight for antarctic and subantarctic species and between 1.2 and 3.8% for temperate and subtropical species. Antarctic krill was usually poorly represented in the stomachs of all but 1 myctophid species. The results of this study therefore do not support the hypothesis that krill plays a major role in the feeding ecology and budget of mytophids. (Auth. mod.)

B-55281

Hagen, W., Van Vleet, E.S., Kattner, G., **Seasonal lipid storage as overwintering strategy of antarctic krill,** *Marine ecology progress series,* Apr. 25, 1996, 134(1-3), p.85-89, 33 refs.

This study reports on the seasonal lipid dynamics of *Euphausia superba* (25 to 56 mm) collected in the Weddell Sea in late winter/spring, summer, autumn and mid-winter. Total lipid data provide evidence of large seasonal accumulation of reserve lipids in austral summer with a mean lipid content of 28.2% of dry mass and particularly in autumn, when mean lipid levels peak at 39.2% of dry mass. After the overwintering period, mean lipid contents decrease to a minimum of 10.5% of dry mass, indicating extensive utilization of lipid reserves during winter. These data suggest that lipids contribute significantly to the overwintering success of this extremely versatile species. Lipid class analyses of spring and summer specimens (10 to 56 mm) from the Antarctic Peninsula and the Weddell Sea revealed that not only triacylglycerol, but also phosphatidylcholine may serve as important storage lipids of *E. superba.* In the other dominant antarctic krill species, *E. crystallorophias* (10 to 40 mm) and *Thysanoessa macrura* (10 to 27 mm), wax esters are the primary depot lipid, but phosphatidylcholine also functions as a storage lipid in these species. (Auth. mod.)

B-55282

Pakhomov, E.A., Perissinotto, R., **Trophodynamics of the hyperiid amphipod *Themisto gaudichaudi* in the South Georgia region during late austral summer,** *Marine ecology progress series,* Apr. 25, 1996, 134(1-3), p.91-100, 44 refs.

The feeding dynamics and predation impact of the hyperiid amphipod *Themisto gaudichaudi* on mesozooplankton were studied in the vicinity of South Georgia during austral summer 1994. Data show that *T. gaudichaudi* is a visual opportunistic predator, consuming primarily the most abundant species of copepods, euphausiids and pteropods. *In situ* estimated daily rations were equivalent to 6.3% of body dry weight, and similar to the value of 7.1% of body dry weight derived using an energy budget approach which takes into account the total daily energy requirements. *In vitro* estimates produced daily rations higher than these, ranging from 8.5 to 21.8% of body dry weight and increasing with prey density. The predation impact of *T. gaudichaudi* adults never exceeded 2.1% of mesozooplankton standing stock per day but accounted for up to 70% of the daily secondary production. This suggests that in the vicinity of South Georgia *T. gaudichaudi* adults are able to control the local mesozooplankton community and may contribute significantly to the downward flux of biogenic carbon. (Auth. mod.)

B-55283

Kattner, G., Hagen, W., Falk-Petersen, S., Sargent, J.R., Henderson, R.J., **Antarctic krill *Thysanoessa macrura* fills a major gap in marine lipogenic pathways,** *Marine ecology progress series,* Apr. 25, 1996, 134(1-3), p.295-298, 26 refs.

The unique predominance of oleyl alcohols (18:1) is the striking characteristic of the lipids of the antarctic euphausiid *Thysanoessa macrura.* No marine zooplankton species has previously been reported which produces wax esters with significant amounts of 18 carbon fatty alcohols. *T. macrura* specimens were collected in the high antarctic Weddell Sea during autumn 1992 and summer 1993. Their lipid levels were high, about 40 to 50% of the dry mass with up to 70% of the total lipid as wax esters. The wax ester fatty acids were dominated by the saturates 14:0 and 16:0, which, along with the monounsaturate 18:1(n-9), accounted for more than 80% of the total fatty acids. Phospholipids contained high levels of (n-3) polyunsaturated fatty acids (20:5 and 22:6) typical of membrane lipids from marine zooplankton. This discovery underscores the biochemical adaptability of antarctic zooplankton species to a constantly cold and highly seasonal polar environment. (Auth. mod.)

B-55309

Bayer, F.M., **New primnoid gorgonians (Coelenterata: Octocorallia) from antarctic waters,** *Bulletin of marine science,* Mar. 1996, 58(2), p.511-530, 7 refs.

Two new genera and species of the gorgonacean family Primnoidae are described and illustrated by scanning electron micrographs. Reproductive polyps of both *Tokoprymno maia* new genus, new species and *Aglaoprimnoa stefanii* new genus, new species, are adapted for brooding the young through early stages of larval development. *A. stefanii* is similar in gross appearance to *Armadillogorgia cyathella* Bayer, 1980, with which it is compared. (Auth.)

B-55310

Andrew, T.G., Hecht, T., Heemstra, P.C., Lutjeharms, J.R.E., **Fishes of the Tristan da Cunha group and Gough Island, South Atlantic Ocean,** *Ichthyological bulletin,* May 1995, No.63, p.1-43, Refs. p.36-41.

Recent collections of fishes from the islands of the Tristan da Cunha Group (Tristan, Inaccessible and Nightingale) and Gough I. have produced 25 new records. Fifty-one species are known to occur in the near-shore waters of the islands (46 of these are documented by specimens and another 5 species are probable). A diagnosis, synonymy and in most cases, an illustration, are provided for each species. For certain species, brief notes on biology, relative abundance and seasonal distribution are included. The neritic ichthyofauna of the Subtropical Convergence (STC) region is characterized, and the importance of this frontal zone as a barrier to dispersal of species in the southern ocean is evaluated. Analysis of the zoogeographic affinities of the Tristan/Gough fish fauna resulted in a redefinition of the West Wind Drift Islands Province (WWDI), comprising the Tristan Group and Gough in the South Atlantic and St. Paul and Amsterdam Islands in the southern Indian Ocean. (Auth. mod.)

B-55311

Bargagli, R., Broady, P.A., Walton, D.W.H., **Preliminary investigation of the thermal biosystem of Mount Rittmann fumaroles (northern Victoria Land, Antarctica),** *Antarctic science,* June 1996, 8(2), p.121-126, 27 refs.

The biota and environment of fumarolic ground recently discovered near Mount Rittmann are described. Three patches (about 1 m^2 each) of the moss *Pohlia nutans* were found in a minor caldera rim. Cyanophytes, chlorophytes, protozoa and bacteria were isolated from the moss and warm ground (30-50°C). The results are compared with those of previous studies on antarctic volcanoes. The origin of the geothermal flora is discussed in terms of long-distance transport of propagules to the continent. (Auth.)

B-55312

Convey, P., **Reproduction of antarctic flowering plants,** *Antarctic science,* June 1996, 8(2), p.127-134, Refs. p.133-134.

Reproductive allocation (reproductive biomass relative to vegetative biomass) and seed production were measured for samples of the two native phanerogams occurring in Antarctica. Material collected on South Georgia, Signy I. and Léonie I. allowed an initial comparison of reproduction over a wide latitudinal range. Sizes of vegetative and reproductive structures of *Colobanthus quitensis* were smaller in Signy I. samples than those from South Georgia or Léonie I. This pattern was reflected in the pattern of seed production. Vegetative and reproductive structures of *Deschampsia antarctica* were generally similar in size at both maritime antarctic sites, but larger at subantarctic South Georgia. Seed production was similar in each season assessed and at all three sites. Reproductive strategies do not form any specific adaptation to the antarctic environment for these species. Reasons for the failure of other higher plants to become established in the maritime Antarctic are discussed, and it is concluded that geographical isolation is the main factor. (Auth. mod.)

B-55313

Gleitz, M., Grossmann, S., Scharek, R., Smetacek, V., **Ecology of diatom and bacterial assemblages in water associated with melting summer sea ice in the Weddell Sea, Antarctica,** *Antarctic science,* June 1996, 8(2), p.135-146, Refs. p.144-146.

The fate of ice biota released via meltwater into pools of seawater trapped between melting ice floes (crack pools) was followed in late Jan. in the southern Weddell Sea. Low-salinity crack pools shared the following features: nitrate exhaustion, high pH and POC/PON ratios, high bacterial biomass composed of large cells, and a dense algal assemblage dominated to over 90% by only two diatom species. It is suggested that this "climax stage" evolved from a nutrient rich, moderate biomass situation prevailing in high salinity crack pools, and is representative of summer succession of sea ice biota. "Overflow" production following nitrate exhaustion by the algae resulted in internal (lipid) and external (presumably mucus) carbon pools. The latter must fuel bacterial biomass build-up, as algal mortality appeared to be low. The large algal and bacterial stocks point to low grazing pressure exerted by phagotrophic protists, presumably due to poor food quality and/or excessive mucus production. It is concluded that environmental selection of the abundant ice algal species occurs under conditions prevailing in the disintegrating ice cover during summer, which differ drastically from those generally referred to as characteristic of the sea ice habitat at large, i.e. a combination of low temperature, low light and high salinity. (Auth.)

B-55314

Moen, J., Walton, D.W.H., **Biomass allocation in a subantarctic clonal plant *(Acaena magellanica)* under grazing by introduced reindeer,** *Antarctic science,* June 1996, 8(2), p.147-154, Refs. p.153-154.

Biomass allocation and growth by the clonal plant *Acaena magellanica* were characterized for three populations grazed by introduced reindeer on South Georgia. Annual growth markers (internode lengths) were used to divide each rhizome into current year's shoots, one-year-old and two-year-old rhizome segments. Total dry weights were significantly smaller in grazed than in ungrazed populations. Leaf biomass of current year's shoots was very much lower in grazed shoots. Rhizome length and number of leaves were less affected than dry weight by grazing, and the reindeer grazing thus seems to mainly influence biomass accumulation rather than morphology in *Acaena.* Interactions with *Festuca contracta* in both grazed and ungrazed areas were also studied in a two-year competition experiment. (Auth.)

B-55315

North, A.W., **Fish in the diet of antarctic fur seals *(Arctocephalus gazella)* at South Georgia during winter and spring,** *Antarctic science,* June 1996, 8(2), p.155-160, Refs. p.159-160.

The occurrence of fish in the diet of the antarctic fur seal *(Arctocephalus gazella)* at Bird I. was investigated by analysis of fish otoliths in scats collected during late May to early Nov. 1983. Of the 55 scats examined, 49 contained fish remains, and 45 contained fish otoliths. Ten fish species were represented by 415 otoliths, while 33 otoliths were too far digested to be identified unequivocally. Fish size was estimated from otolith size based on published allometric equations. Four coastal notothenioid fishes dominated the fish component of the diet: *Champsocephalus gunnari* and *Gobionotothen gibberifrons* each comprised about 40% of the total fish mass; *Chaenocephalus aceratus* was ranked third by mass and the smaller *Lediponotothen larseni* occurred in one quarter of the scats but was of lower importance in terms of mass. The length-frequency distribution of *C. gunnari* landed by the commercial fishery in Oct. 1982 to June 1983 is similar to that which comprised the bulk of the diet in the present study. (Auth.)

B-55316

Pizarro, H., Izaguirre, I., Tell, G., **Epilithic algae from a freshwater stream at Hope Bay, Antarctica,** *Antarctic science,* June 1996, 8(2), p.161-167, 17 refs.

Temporal and spatial variations of epilithic phycoflora were studied in one of the largest streams at Hope Bay during the summer of 1992-93. A complete floristic inventory was made, and the relative frequencies of each algal taxon were estimated. Periphytic cumulative chlorophyll *a* was measured by means of artificial substrata. The stream was a typical maritime antarctic lotic ecosystem, with evident signs of enrichment by sea-birds. Variability in discharge strongly affected the water chemistry, with the high water level periods characterized by the lowest conductivities and dissolved reactive phosphorus concentrations. Epilithic algal communities predominantly consisted of algal mats or filamentous and foliose forms of *Prasiola crispa.* Other dominant species were *Leptolyngbya fragilis, Hydrurus foetidus, Chrysococcus* cf. *rufescens* and *Phaeogloea mucosa.* Whilst *P. crispa* appeared more frequently near the origin of the stream in Boeckella Lake, Chrysophyceae were better developed towards the mouth. (Auth.)

B-55317

Rota, E., Erséus, C., **Six new species of *Grania* (Oligochaeta, Enchytraeidae) from the Ross Sea, Antarctica,** *Antarctic science,* June 1996, 8(2), p.169-183, Refs. p.182-183.

Six new species of marine Enchytraeidae, *Grania hirsuticauda* sp. n., *G. acanthochaeta* sp. n., *G. carchinii* sp. n., *G. angustinasus* sp. n., *G. antarctica* sp. n. and *G. algida* sp. n., are described from benthic material collected in McMurdo Sound during 1959-61 and Terra Nova Bay in 1988. They represent the first records of this family from below the antarctic circle and, together with tubificids, the first oligochaetes from the Ross Sea. *G. hirsuticauda* is distinguished by having setae larger in the posterior third of the body and almost nodulate; *G. acanthochaeta* possesses a unique, thorn-like setal morphology and diverticulate spermathecal ampullae. *G. carchinii,* the only new species lacking lateral setae, is also distinguished by a remarkably high development of the chloragogen tissue. *G. angustinasus* and *G. antarctica* have the same setal distribution, size and shape, but show different forms of penial bulbs and spermathecal structures. *G. algida* is distinguished by its L-shaped setae and carrot-shaped, diverticulate, spermathecal ampullae. (Auth. mod.)

B-55318

Vacchi, M., Williams, R., La Mesa, M., **Reproduction in three species of fish from the Ross Sea and Mawson Sea,** *Antarctic science,* June 1996, 8(2), p.185-192, Refs. p.191-192.

Reproductive characteristics are compared of the nototheniids *Trematomus bernacchii* and *T. hansoni* and the channichthyid *Chionodraco hamatus* caught in summer in Terra Nova Bay and all year round in the waters off Casey Station. Whilst spawning of *T. bernacchii* took place in Oct.-Nov., the spawning period of *T. hansoni* differed between the 2 sites (Sep.-Nov. off Casey, Dec.-Feb. in Terra Nova Bay). The spawning period also differed between sites for *C. hamatus* (Aug.-Oct. off Casey, Dec.-Feb. in Terra Nova Bay) Fecundity was higher and egg size was lower in nototheniid species (c. 8000 eggs of 3-4 mm) than in channichthyid (c. 4000 eggs of 4-5 mm). Moreover, the fecundity was lower and egg size higher in the specimens from Terra Nova Bay when compared to Casey. (Auth.)

B-55322

Sun, S., Wang, R., **Study on the relationship between the diameter of the compound eye and growth of antarctic krill,** *Antarctic research (Chinese edition),* 1996, 8(1), p.1-8, In Chinese with English summary. 10 refs.

The correlation between body length and the diameter of the compound eye of the antarctic krill *Euphausia superba* was examined. Samples collected in the late summer show an apparent exponential relationship between the eye diameter and the body length. From the laboratory population, it seems that when the krill shrink, the diameter of the compound eye does not decrease. It is hence more reliable to use eye diameter as krill growth index than body length. The ratio of the body length to the diameter of the compound eye offers another method for detecting the effect of shrinking in natural populations of krill. (Auth.)

B-55332

Dearborn, J.H., Hendler, G., Edwards, K.C., **Diet of *Ophiosparte gigas* (Echinodermata: Ophiuroidea) along the Antarctic Peninsula, with comments on its taxonomic status,** *Polar biology,* May 1996, 16(5), p.309-320, Refs. p.319-320.

Analyses of stomach contents of 121 adult *Ophiosparte gigas* Koehler 1922, collected along the western coast of the Antarctic Peninsula in 1981-1983, show that this species is an active predator and scavenger whose diet consists of representatives of at least 10 phyla. The top five prey groups are sponges, ophiuroids, bivalves, polychaetes and crustaceans by percentage frequency of occurrence, and ophiuroids, bivalves, polychaetes, amphipods and sponges by fullness relative volume. Rankings of prey by various frequency and volume measures vary among different sites, suggesting that *O. gigas* is an opportunistic feeder. Significant differences in diet, feeding behavior and morphological characteristics related to feeding, and others, including composition of the integument and structure of the oral and dental plates, show the conventional placement of the monotypic genus *Ophiosparte* in the Ophiacanthidae is not justified. The authors suggest placement in the Ophiomyxidae but formal designation within a subfamily must await a thorough revision of the suborder Ophiomyxina. (Auth.)

B-55333

Trathan, P.N., Croxall, J.P., Murphy, E.J., **Dynamics of antarctic**

penguin populations in relation to inter-annual variability in sea ice distribution, *Polar biology,* May 1996, 16(5), p.321-330, Refs. p.329-330.

To investigate the role of sea ice cover on penguin populations, the authors used principal component analysis to compare population variables of Adélie *(Pygoscelis adeliae)* and chinstrap *(P. antarctica)* penguins breeding on Signy I. with local (from direct observations) and regional (from remote sensing data) sea ice variables. Throughout the study period, the Adélie penguin population size remained stable, whereas that of chinstrap penguins decreased slightly. For both species, no general relationship was found between either population size or breeding success and the local sea ice conditions. However, the regional sea ice extent at a particular time prior to the start of the breeding season was related to the number of birds that arrived to breed. For both species, this period occurred before the sea ice reached its maximum extent and was slightly earlier for Adélie than for chinstrap penguins. These results suggest that sea ice conditions outside the breeding season may play an important role in penguin population processes. (Auth. mod.)

B-55334

Hull, C.L., Wilson, J., **Effect of investigators on the breeding success of royal, *Eudyptes schlegeli,* and rockhopper penguins, *E. chrysocome,* at Macquarie Island,** *Polar biology,* May 1996, 16(5), p.335-337, 15 refs.

The impact on reproductive success of investigators studying the breeding biology of royal and rockhopper penguins was assessed. Control and experimental transects were established in a colony of each species and the number of active nests, from egg laying to creche stage, were compared. Experimental nests were those used in breeding biology work, where birds were measured and banded, and nest checks were carried out at least once per week. Control nests were in equivalent locations but birds were not handled, and no contact was made with the nests once breeding had begun. There were no significant differences in the number of active nests between the control and experimental transects (and, therefore, breeding success) in either species. It is concluded that, provided care is taken when working with these species, no impacts on the short-term breeding success of these populations will occur. (Auth.)

B-55335

Weidinger, K., **Effect of weather on the cyclic patterns of colony attendance in the Cape petrel *Daption capense*,** *Polar biology,* May 1996, 16(5), p.339-344, 19 refs.

Colony attendance of Cape petrels on Nelson I. fluctuated in a nonrandom pattern. In the pre-breeding period a relatively weak cycle of about 6 days was observed. Low attendance was associated with brief periods of either SE wind or strong wind, the effects of which lasted 2 days. During breeding, regular attendance cycles were approximately twice as long (8 days) as the average incubation shift (3.8 days). Breeding attendance was lowered on 2 days after strong wind and on days with SE wind, but only wind speed showed a significant effect when both variables were considered. Post-breeding colony attendance showed a continuation of the rhythm established during breeding, but with the majority of birds participating. Correlations found between wind factors and colony attendance suggest that some weather characteristics, which themselves were not truly cyclic, could act to synchronize the endogenous rhythms of individual birds. (Auth. mod.)

B-55336

Daneri, G.A., **Fish diet of the antarctic fur seal, *Arctocephalus gazella,* in summer, at Stranger Point, King George Island, South Shetland Islands,** *Polar biology,* May 1996, 16(5), p.353-355, 18 refs.

In Feb. 1992, 34 faecal samples from non-breeding male antarctic fur seals *Arctocephalus gazella* were collected at Stranger Point. Fish constituted an important part of the diet, occurring in 90% of those scats containing prey remains. From 1162 otoliths found in the faeces, 1086 were identified to at least family level. Myctophids and nototheniids represented together almost 90% of the fish eaten. The dominant species were *Gymnoscopelus nicholsi, Pleuragramma antarcticum* and *Electrona antarctica,* contributing 33.3, 30.8 and 12.0% of the otoliths respectively. The standard length of these three species was estimated from otoliths having little or no signs of erosion. This study showed that fur seals fed mainly on pelagic fish species that are often associated with krill. These findings are corroborated by fur seal diving patterns. (Auth.)

B-55337

Weykam, G., Wiencke, C., **Seasonal photosynthetic performance of the endemic antarctic red alga *Palmaria decipiens* (Reinsch) Ricker,** *Polar biology,* May 1996, 16(5), p.357-361, Refs. p.360-361.

A male gametophyte of the endemic antarctic red macroalga *Palmaria decipiens* (Reinsch) Ricker was cultivated under fluctuating daylengths, simulating the seasonal changes on King George I. The plant was maintained at 0°C, an irradiance of 25 μmol/m^2/s and under growth-saturating nutrient conditions. Samples were taken at intervals of 3-6 weeks to measure growth, photosynthesis, dark respiration and pigment content. The growth optimum in spring coincided with a higher photosynthetic activity. Dark respiration was constantly low over the year; there was a rapid increase in maximum photosynthetic rate (P_{max}) in conditions corresponding to Sep. and Oct. Higher activity in photosynthesis mainly resulted from higher Chl *a* and phycobilin concentrations during austral spring, an indication of an increase in absorption cross-section areas of photosynthetic reaction centers. These changes in physiology are discussed in relation to the seasonal growth "strategy" of the species, which is controlled by seasonal variation in daylength. (Auth. mod.)

B-55338

Saiz-Salinas, J.I., **Echiura from South Shetland Islands together with a review of its geographic distribution in the Antarctic Ocean,** *Polar biology,* May 1996, 16(5), p.363-370, Refs. p.369-370.

Echiuran worms collected by the Spanish BENTART (=Bentos Antártico) cruises during 1994 and 1995 to the South Shetland Is. from depths ranging from 24 to 1019 m are recorded. Three species are recognized: *Alomasoma belyaevi, Echiurus antarcticus* and *Prashadus* sp., with the presence of *Prashadus* sp. confirmed in the Antarctic. Distribution maps and a checklist of the echiuran species south of the Antarctic Convergence, with depths and bibliographic references, are included. (Auth.)

B-55339

Culik, B.M., Pütz, K., Wilson, R.P., Bost, C.A., Le Maho, Y., Verselin, J.L., **Core temperature variability in diving penguins *(Aptenodytes patagonicus)*: a preliminary analysis,** *Polar biology,* May 1996, 16(5), p.371-378, Refs. p.377-378.

Core temperatures were determined in two king penguins living in the wild on Possession I. using implantable four-channel temperature loggers. Core temperatures derived from bird no. 1 (sensor placed under the sternum, in the vicinity of the liver and upper stomach) were closely correlated with diving activity (as determined by an external light recorder), and ranged from 38.3°C on land to a minimum of 37.2°C during a dive. Core temperatures measured in bird no. 2 showed that temperatures near the heart were generally 1°C lower than those under the sternum or in the lower abdomen. Core temperatures declined continuously during dives (by 0.8, 1.2 and 2.7°C in the lower abdomen, under the sternum and near the heart, respectively) and showed precipitous drops to 35°C, probably associated with ingestion of food. Temperatures measured near the heart fluctuated over a period of 288 s, corresponding to the duration of the surface/dive cycle. The relevance of these findings to diving physiology, blood perfusion of tissues, tissue metabolism and aerobic dive limits is discussed. (Auth.)

B-55340

Woehler, E.J., **Concurrent decreases in five species of southern ocean seabirds in Prydz Bay,** *Polar biology,* May 1996, 16(5), p.379-382, 14 refs.

This study documents the concurrent decreases in at-sea abundances of five species of southern ocean seabirds (wandering albatross *D. exulans,* black-browed albatross *D. melanophrys,* light-mantled sooty albatross *Phoebetria palpebrata,* northern giant petrel *Macronectes halli* and white-chinned petrel *Procellaria aequinoctialis)* in Prydz Bay over the period 1980-81 and 1992-93. This is the first instance that population decreases have been detected from at-sea surveys in the southern ocean. (Auth. mod.)

B-55342

Lara, W.H., Barretto, H.H.C., Inomata, O.N.K., Montone, R., Weber, R.R., **Organochlorine residues in antarctic penguins,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.1-6, 13 refs.

Samples of adult penguin tissues (blood, fat, uropygial gland) were collected in the King George I. area in Feb. 1989, and analyzed for chlorinated hydrocarbons by gas chromatography. HCB, alpha-HCH, gamma-HCH, pp'-DDE, pp'-DDT, op'-DDT and PCBs were found in the majority of the samples. Levels of total HCH (sum of the isomers) in the blood samples were from a minimum of 0.58 ng/g to a maximum of 1.91 ng/g and the levels of σDDT were from 0.10 to 4.2 ng/g. The levels of PCBs were from nd. (<3.0) to 14.1 ng/g. In the fat tissue and uropygial gland, they were in some cases about one hundredfold higher than those found in the blood samples. (Auth.)

B-55343

Phan, M.T., Nachi, A.M., **Antarctic fish retina. Histological variations under continuous darkness,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.7-11, 14 refs.

Six common fish species from Admiralty Bay and Deception I. were submitted to different periods of artificial darkness during austral summers. The retina kept in continuous darkness showed tight concentration of pigments in the pigment epithelial cell bodies, elongated rod outer segments, absence of normal interaction between pigment epithelium and photoreceptor, phagosoma with rod outer segment tips and conglomerations of pigment granules in the pigment epithelium, and macrophages loaded with pigments in the subretinal space. Results suggest that the turnover of rod outer segment and the metabolism of retinal pigment are disturbed under continuous darkness. The photomechanical movement was confirmed in studied species. (Auth.)

B-55344

Pereira, A.B., **New occurrence of *Usnea* in Antarctica,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.13-16, 6 refs.

The lichen *Usnea trachycarpa,* collected at Ullmann Point on Jan. 6, 1989, is reported in Antarctica for the first time, and is described and illustrated. It is suggested that with this finding, the genus *Usnea* is now represented in Antarctica by 6 species.

B-55345

Putzke, J., Pereira, A.B., **Mosses of King George Island, Antarctica,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.17-71, Refs. p.67-71.

Results from a survey of the species of mosses (Bryophyta-Musci) reported from and collected on King George I. are given. General descriptions of the area and discussion about the plant communities are presented, together with keys to the genera and species, and description and illustration of each taxon found on the island. A glossary with about 150 words currently used in Bryology and in the text is presented to introduce this topic to a wide range of investigators. A list of important synonymized epithets is also included for each species. (Auth. mod.)

B-55346

Pereira, A.B., Sander, M., Strieder, M.N., **Biologic notes about Turret Point, King George Island, Antarctica,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.73-77, Refs. p.76-77.

This paper shows preliminary results pertinent to flora, birds and mammalia of Turret Point. The vegetation is characterized by species that form varied floristic arrangements. The birds are represented by seven species in reproduction; the Giant petrel represents the most significant reproducing population. Fur seals are abundant, reaching a maximum number of 1,200 specimens in a 25,000 m^2 stretch of shore of the Point. (Auth.)

B-55347

Pereira, A.B., Putzke, J., Sander, M., **Plants utilized by *Larus dominicanus* Lichtenstein, 1823 for nest building at the South Shetland Island, Antarctica,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.79-85, 11 refs.

In the 1988-89 and 1989-90 austral summers, 15 nests of *Larus dominicanus* found on King George and Nelson islands were studied. The plants were identified as mosses, lichens, red algae and vascular plants. Plant weights obtained were used for correlation of the nest building habits, of the communities vegetation and of the availability of plants. (Auth.)

B-55349

Navas-Pereira, D., Vannucci, M., **Antarctic hydromedusae and water masses,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.101-141, Refs. p.139-141.

From 1962 to 1967 a broad sampling program was carried out during the oceanographic cruises of the USNS *Eltanin.* Particular attention was given to the ecological significance of the Antarctic Convergence and to the effect of the vertical zonation of water masses in the antarctic and subantarctic regions considered to be regulators of the distribution of organisms. Approximately 730 plankton samples were studied, including the distribution of hydromedusae. Typical antarctic species are restricted to cold waters with low salinity and high dissolved-oxygen content. Hydromedusae, however, may drift and survive in other water masses whose ecological parameters are still within the tolerance limits of the species. Thus eurybathic but stenohaline or stenothermal species may be found at the surface in the antarctic ocean and at great depths at equatorial latitudes or even north of the Equator. The study of this collection corroborates earlier findings concerning the value of hydromedusae as good indicators of water masses; they also show the need of planning and implementing a representative zooplankton sampling design in time and space. This must be related to the structure of the physical oceanographic pattern of each geographic area according to the season and time of sampling. (Auth. mod.)

B-55356

Barnes, D.K.A., Peck, L.S., **Epibiota and attachment substrata of deep-water brachiopods from Antarctica and New Zealand,** *Royal Society of London. Philosophical transactions. Series B,* May 29, 1996, 351(1340), p.677-687, Refs. p.685-687.

Prevalence (proportion of host organisms covered) and cover of encrusting epibiota were investigated for four antarctic and two New Zealand species of deep-sea brachiopods. All epibiota was identified to the lowest possible taxonomic level, such that prevalence and dominance of each taxon could be assessed on different brachiopod species. Punctae had no detectable influence on fouling, whereas valve architecture and ornamentation were probably a major influence. Prevalence and percent cover of epibiota were found to decrease with depth from 50-600 m in the antarctic terebratulid *Liothyrella uva.* A maximum of 5% epibiotic cover was recorded on the punctate terebratulids from beyond 160 m *(L. uva, Magellania fragilis* and *M. joubini* from Antarctica). Epibiotic cover significantly increased with valve area to over 40% in the antarctic inarticulate *Neocrania lecointei.* Bryozoans, foraminiferans and polychaetes were the most abundant colonizers, but there were also representatives present from seven other phyla. (Auth. mod.)

B-55357

Lorentsen, S.H., **Regulation of food provisioning in the antarctic petrel *Thalassoica antarctica*,** *Journal of animal ecology,* May 1996, 65(3), p.381-388, Refs. p.387-388.

Life-history theory predicts that individual birds should invest in reproduction according to their current body condition and the future prospects for survival and reproduction. Thus, it could be expected that current adult body condition should significantly influence food provisioning rates, food loads and concurrent chick growth in the antarctic petrel. In order to study the significance of parental body condition, the author correlated meal sizes, feeding frequencies and chick growth with the body condition of the parents. There was a strong correlation between the average meal size delivered to a chick and its growth rate. Adult body condition at the time of hatching was strongly correlated with the average size of meals delivered to individual chicks. The difference in body mass at the age of 30 days of chicks from parents with good body condition compared with chicks from parents with poorer body condition was nearly double that expected. The results strongly suggest that the effort spent during the chick-rearing period, and thus reproductive success, is regulated by the body condition of the parents. (Auth. mod.)

B-55364

Hagen, W., Schnack-Schiel, S.B., **Seasonal lipid dynamics in dominant antarctic copepods: energy for overwintering or reproduction?**, *Deep-sea research,* Feb. 1996, 43(2), p.139-158, Refs. p.155-158.

Copepodite stages V and females of 4 dominant antarctic species of calanoid copepods were collected during various expeditions to the eastern Weddell Sea in mid-winter, late winter to early spring, summer and autumn. Analyses of total lipid content and sexual maturity showed some general similarities among species concerning the seasonal cycle of energy reserves and gonad maturation, but also revealed important interspecific differences in the life histories of these copepods. *Calanus propinquus* and *Metridia gerlachei* exhibited a seasonal lipid pattern with maxima in autumn and lipid minima during spring. Lipid decrease in the females usually coincided with gonad maturation, which proceeded well before the onset of phytoplankton production. This basic pattern was not as clearly discernible in the females of *Calanoides acutus* and *Rhincalanus gigas.* The findings emphasize the importance of lipid reserves for fueling reproductive processes before the spring phytoplankton bloom becomes available. (Auth. mod.)

B-55367

Jouventin, P., Mauget, R., **Endocrine basis of the reproductive cycle in the king penguin *(Aptenodytes patagonicus)***, *Journal of zoology (London),* Apr. 1996, 238(4), p.665-678, Refs. p.677-678.

On the Crozet Is., the King penguin can rear one chick every two years at best: a successful breeding is followed by unsuccessful late breeding (or by non-breeding). A large part of the population displays an annual periodicity of breeding attempts but with low individual breeding success. The restarting of the reproductive cycle appears basically to be annual, the pituitary responding to the photoperiod. Steroid patterns present classical variations of level according to the reproductive stage. Prolactin (PRL) and luteinizing hormone (LH) are antagonists, but in this species PRL remains high without external stimulation. To re-lay after failure in the field, the authors had to break down experimentally endogenous PRL, demonstrating that PRL has a key role in the reproductive cycle. (Auth. mod.)

B-55378

Hunter, F.M., Miller, G.D., Davis, L.S., **Mate switching and copulation behaviour in the Adélie penguin**, *Behaviour,* Aug. 1995, 132(9-10), p.691-707, Refs. p.706-707.

In monogamous species of birds sperm competition may result from either extra-pair copulations or mate switching. The aim of this study was to examine copulation behavior in the Adélie penguin *(Pygoscelis adeliae),* a species in which females copulate sequentially with more than one male. 14.9% of females switched mates during the pre-laying period; all of these females engaged in successful copulations with both initial and final males. An estimated 9.8% of females engaged in successful EPCs over the same time period. Females that switched mates had on average 8 successful copulations with their initial partner while females that engaged in extra-pair copulation attempts had on average only 0.5 successful copulations with their extra-pair partner. These same females had on average 17 pair copulations per clutch. Frequencies of copulation that are higher than necessary for fertilization are consistent with mechanisms of both last male sperm precedence and proportional representation. However, there is no support for last male sperm precedence from either diurnal or seasonal patterns of copulation relative to fertilization. It appears that a high frequency of copulation may have evolved in pair males to protect paternity against initial males in this species. (Auth. mod.)

B-55385

Hunter, F.M., Davis, L.S., Miller, G.D., **Sperm transfer in the Adélie penguin**, *Condor,* May 1996, 98(2), p.410-413, 29 refs.

Here the authors look at sperm transfer in a wild population of Adélie penguins *(Pygoscelis adeliae)* by combining behavioral observations of cloacal contact and ejaculate transfer with collection of ejaculates and identification of presence or absence of sperm by microscopic examination. The aim of the study is to determine the true success rate, in terms of sperm transfer, of behaviorally successful copulations and the reason for failure of sperm transfer. (Auth. mod.)

B-55388

Gómez, I., Wiencke, C., Thomas, D.N., **Variations in photosynthetic characteristics of the antarctic marine brown alga *Ascoseira mirabilis* in relation to thallus age and size**, *European journal of phycology,* May 1996, 31(2), p.167-172, 28 refs.

Growth, photosynthesis, dark respiration, chlorophyll *a* (Chl *a*) content and dry weight were measured in 2- and 3-year old plants of *Ascoseira mirabilis* (Ascoseirales), cultivated in the laboratory under changing daylengths which matched the seasonal variations in the Antarctic. Determinations were made in four thallus regions. Growth of *A. mirabilis* was seasonal, with higher rates in spring. Parameters such as net photosynthesis, photosynthetic efficiency, both measured on a fresh weight basis, and dry weight content, showed significant age- and size-dependent variations. In contrast, no variations were observed in dark respiration, initial light-saturating point of photosynthesis or Chl *a* contents. The results indicate that some morpho-functional processes in *A. mirabilis,* especially net photosynthesis and photosynthetic efficiency, are governed by age of the plant, thereby reflecting differences in biomass allocation and size. The data also confirm the previously demonstrated relationship between growth and seasonal physiological activity that allows *A. mirabilis* to survive under the low light conditions prevailing in the Antarctic. (Auth. mod.)

B-55393

Laybourn-Parry, J., Ellis-Evans, J.C., Butler, H., **Microbial dynamics during the summer ice-loss phase in maritime antarctic lakes**, *Journal of plankton research,* Apr. 1996, 18(4), p.495-511, Refs. p.509-511.

The dynamics of bacterioplankton and protozooplankton in two maritime antarctic lakes (Heywood Lake and Sombre Lake) were studied during the phase of ice break-out (Dec. and early Jan. 1994-95). The lakes are suffering animal-induced (fur seal) eutrophication, with Heywood Lake the most severely affected. Both lakes had morphologically diverse bacterial communities which increased during the study period, reaching maxima of 80 x 10^8/l in Heywood Lake and 31.8 x 10^8/l in Sombre Lake. Heterotrophic nanoflagellates (HNAN) reached a peak in late Dec. Phototrophic nanoflagellates (PNAN) peaked in late Dec. after ice loss in Heywood Lake. In Sombre Lake, ice persisted for a longer period and here PNAN reached their highest density at the end of the study period. Ciliate abundance reached highest levels in Heywood Lake. Protozooplankton diversity was greater in the less-enriched Sombre Lake. HNAN grazing on bacteria was curtailed in Heywood Lake in early Jan. as a result of predation by microcrustacean larvae feeding on the plankton. (Auth. mod.)

B-55394

Van der Spoel, S., **Hypothesis on Mesozoic vicariance in Hydromedusae**, *Journal of plankton research,* Apr. 1996, 18(4), p.615-634, Refs. p.633-634.

In the Hydromedusae, many species show a tendency to be less restricted to a special distribution pattern compared to most other planktonic organisms. The present-day patterns of Narcomedusae and Trachymedusae seem to originate from an antarctic fauna; the other subclasses of Hydromedusae show distribution patterns around the Indo-Malayan Archipelago. It is presumed that the Hydromedusae reflect a post-Cretaceous dispersal from two faunal centers, Indo-Malaya and Antarctica, that had already became separated in Eocene times. The two Eocene faunal centers can be derived from one continuous area in which Hydromedusae survived the period of extinction at the end of the Cretaceous. Splitting of this center probably forms the vicariant event responsible for the development of the Narcomedusae and Trachymedusae in antarctic waters, and of the Anthomedusae, Leptomedusae and Limnomedusae in Indo-Malayan waters. (Auth. mod.)

B-55400

Park, J.Y., Wägele, J.W., **On a small collection of valvifera (Crustacea isopoda) from the Magellan Strait, with description of *Platidotea Magellanica* n.gen.n.sp.**, *Amsterdam. Zoölogisch Museum. Bulletin,* 1995, 14(6), p.57-100, 26 refs.

Redescriptions of 5 arcturid species from the Strait of Magellan are presented, and the validity of the genus *Rectarcturus* is discussed. *Platidotea magellanica* n.gen. n.sp. is described. This is a new type of idoteid isopod, with flattened body and antennae, probably adapted to life in sandy bottoms. (Auth.)

B-55401

Olsson, O., **Seasonal effects of timing and reproduction in the King Penguin: a unique breeding cycle,** *Journal of avian biology,* Mar. 1996, Vol.27, p.7-14, 28 refs.

There was a seasonal biomodality found in breeding activities of King penguins at South Georgia, with peaks of courtship and egg-laying 2-3 months apart. The late peak was of birds that bred successfully the previous year, whereas the early peak was of birds that had failed. Successful birds were delayed because the median time for a complete breeding cycle was >14 months. Although most birds made a breeding attempt each year, none bred successfully over two consecutive seasons. Hence, in practice the cycle was biennial. The egg-laying period spanned four months but only pairs that laid within the first quarter of this period were successful. Parental quality, rather than laying date, strongly influenced the outcome of first quarter breeding attempts. No late breeding was successful and why they are undertaken is unclear. At least they posed no measurable cost, either by delaying subsequent breeding or by increasing mortality; this may be important for balancing the low benefit. After the over-wintering fast the chick could be fledged by a single parent; but no sex-specific difference in invested time in the chick near to fledging was observed. (Auth. mod.)

B-55402

Hines, G.A., Bryan, P.J., Wasson, K.M., McClintock, J.B., Watts, S.A., **Sex steroid metabolism in the antarctic pteropod *Clione antarctica* (Mollusca: Gastropoda),** *Invertebrate biology,* Spring 1996, 115(2), p.113-119, 36 refs.

The ability of the antarctic pteropod *Clione antarctica* to synthesize sex steroids from radiolabeled steroid precursors was examined in individuals sampled near the end of their observed reproductive season from McMurdo Sound. The precursors, ^{3}H-progesterone and ^{3}H-androstenedione, were absorbed and subsequently metabolized to produce several progestin and androgen metabolites. Synthesis or accumulation of testosterone and estradiol was not observed. At least 2 unidentified water-soluble progestin metabolites were synthesized, as well as an unidentified esterified steroid. The metabolic accumulation of these steroidal compounds indicates that *C. antarctica* can produce potentially bioactive steroids. The activity of steroid metabolic enzymes in a polar species further indicates the universal capacity of invertebrates from various geographic regions to metabolize biologically relevant steroids. (Auth. mod.)

B-55403

Kociolek, J.P., Jones, V.J., ***Gomphonema Signyensis* sp. nov., a freshwater diatom from maritime Antarctica,** *Diatom research,* 1995, 10(2), p.269-276, 15 refs.

A new species of *Gomphonema* Ehrenberg is described from the sediments of Spirogyra Lake, Signy I. The new species has puncta occluded by external flaps, apical pore fields composed of porelli differentiated from the puncta, an elliptical, internal stigmal opening, septa and pseudosepta. These features ally this new species with the *sensu stricto* group of *Gomphonema.* Valve shape and striae morphology separate this new species from other species of the genus. (Auth.)

B-55404

Schreer, J.F., Testa, J.W., **Classification of Weddell seal diving behavior,** *Marine mammal science,* Apr. 1996, 12(2), p.227-250, 31 refs.

Dives of 15 adult female Weddell seals were recorded with time-depth recorders and 39,119 dives were classified manually and statistically. Four dive types common to all classification methods, and a fifth dive type common to two of the methods, represented most of the observed diving behavior. However, a flat-bottomed dive determined manually may have also represented important behavior. By using a combination of these methods, all dives were classified into six dive types. Inspection of dive variables over time for each dive type, as well as comparisons to previous studies of pinniped diving behavior, indicated different behaviors that the dive types may represent. Hypothesized functions for the dive types were pelagic foraging, benthic foraging, exploration, and traveling. The results indicate that there are strong similarities in diving behavior across various phocid species; that statistical analyses of diving behavior are useful in the analysis of a large data set, and that these analyses reduced human subjective bias in interpreting diving behavior. (Auth. mod.)

B-55405

Iga, K., Fukui, Y., Miyamoto, A., Ishikawa, H., Ohsumi, S., **Endocrinological observations of female minke whales (*Balaenoptera Acutorostrata*),** *Marine mammal science,* Apr. 1996, 12(2), p.296-301, 13 refs.

In earlier programs, information on the reproductive cycle, the morphology of the reproductive tract, and on serum concentrations of steroid hormones in minke whales were reported. However, no data are available concerning the composition of steroid hormones in follicular fluid and follicular oocytes of this species. This study is designed to provide such data.

B-55407

Testa, J.W., **Over-wintering movements and diving behavior of female Weddell seals (*Leptonychotes weddelli*) in the southwestern Ross Sea, Antarctica,** *Canadian journal of zoology,* Oct. 1994, 72(10), p.1700-1710, With French summary. 41 refs.

The movements and diving behavior of 18 adult female Weddell seals were determined by satellite telemetry during the over-winter period in 1990 and 1991. Nine seals provided diving and movement data for 8-9 months. Seals that normally bred in the eastern part of McMurdo Sound spent most of the winter in the middle and northern parts of McMurdo Sound before the annual shore-fast ice had formed in those areas, or in the pack ice 0-50 km north of the Sound and Ross I. This is a greater use of pack ice, as opposed to shore-fast ice, in winter than was previously believed. Some long-distance movements (one over 1500 km in total) to the middle and northwestern parts of the Ross Sea also occurred. Although highly variable within and between individuals, dives indicative of foraging were primarily to mid-water regions (100-350 m) in both years, and were similar to those that have been observed in spring and summer, when *Pleuragramma antarcticum* is the primary prey of Weddell seals in McMurdo Sound. (Auth.)

B-55408

Peck, L.S., Brey, T., **Bomb signals in old antarctic brachiopods,** *Nature,* Mar. 21, 1996, 380(6571), p.207-208, 11 refs.

Using ^{14}C signals to calibrate growth checks in brachiopods from Signy Island, the authors show that the signals reflect a large carbon pool and long residence time in Antarctica. This contradicts the hypothesis that upwelling deep water with low radiocarbon content causes reduced signals in polar oceans.

B-55410

Buchholz, F., Saborowski, R., **Field study on the physiology of digestion in the antarctic krill, *Euphausia superba*, with special regard to chitinolytic enzymes,** *Journal of plankton research,* June 1996, 18(6), p.895-906, 36 refs.

Endo- and exochitinase activities were determined in the stomach and midgut gland of the antarctic krill *Euphausia superba,* along a transect west of the Antarctic Peninsula. Activities were compared with the digestive enzymes protease, cellulase and laminarinase. The chlorophyll and protein contents in the surface water of the corresponding stations were determined. Enzyme activities were characterized by high individual and spatial variations. Chitinolytic activity in the stomach correlated well with all digestive enzymes investigated. The amount of chlorophyll *a* and phytoplankton protein in the surface water was not correlated with enzyme activity. Specific enzyme activity was higher in the stomach than in the midgut gland, showing individual ratios for each enzyme. Elevated endochitinase activity in the stomach suggests that chitinous food is digested to oligomers in the stomach, while the subsequent degradation to amino sugars occurs predominantly in the midgut gland. (Auth. mod.)

B-55411

Peters, E., Thomas, D.N., **Prolonged nitrate exhaustion and diatom mortality: a comparison of polar and temperate *Thalassiosira* species,** *Journal of plankton research,* June 1996, 18(6), p.953-968, 61 refs.

The survival of two diatom species, *Thalassiosira antarctica* Comber isolated from the southern ocean and *Thalassiosira rotula* Meunier isolated from the North Sea, was investigated during a 21 day nitrate-exhaustion period, both in the light and in darkness. Both species endured 3 weeks of nitrate exhaustion in the light by forming a physiological resting state, characterized by the development of shrunken, chlorotic protoplasts, a decrease in photosynthetic capacity and the accumulation of particulate organic carbon (POC). The viability of *T. antarctica* resting cells was lower than that of *T. rotula*. After 21 days in nitrate exhaustion, *T. antarctica* grew at 31% of the initial division rate, whereas the growth rate of *T. rotula* was 61%. When growth was resumed, accumulated POC decreased and particulate organic nitrogen (PON), chlorophyll *a* and photosynthetic carbon assimilation increased during the subsequent 5 day growth periods, but never reached initial values. In the dark, both *Thalassiosira* species survived nutrient exhaustion without physiological impairment. (Auth. mod.)

B-55412

Cueto, M., Darias, J., **Uncommon tetrahydrofuran monoterpenes from antarctic *Pantoneura plocamioides*,** *Tetrahedron,* Apr. 1996, 52(16), p.5899-5906, 2 refs.

The participation of oxygen in the biogenesis of marine monoterpenes allowed the authors to isolate from the antarctic alga *Pantoneura plocamioides* a variety of new monoterpenes that have a tetrahydrofuran ring. The structure and relative stereochemistry of these six compounds, pantofuranoids A-F (1-6), were established by spectroscopic methods. A biogenetic route for the compounds has also been proposed. (Auth.)

B-55413

Vernon, P., Vannier, G., **Developmental patterns of supercooling capacity in a subantarctic wingless fly,** *Experientia,* Feb. 15, 1996, 52(2), p.155-158, 26 refs.

Anatalanta aptera is a wingless fly which lives in subantarctic islands, particularly in sea bird colonies. Developmental patterns of supercooling capacity were studied in an experimental population reared at 5°C and fed ad libitum. Mean supercooling points of the eggs, second and third instar larvae, pupae, teneral and mature adults were -28.0°C, -10.8°C, -8.8°C, 17.6°C, -16.6°C and -8.2°C respectively. Low mean supercooling points were found for inactive stages (eggs, pupae) and, unexpectedly among Diptera, teneral adults. Mature adults had a combination of low supercooling ability, high lipid content and physogastry. The results are compared with those obtained in winged species from other families of Diptera. (Auth.)

B-55416

Legendre, L., **Special role of very small organisms in sustaining the production of large animals in seasonally ice-covered waters,** International Symposium on Okhotsk Sea and Sea Ice, 11th, Mombetsu, Hokkaido, Japan, Feb. 25-28, 1996. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1996, p.254-259, 59 refs.

The question is discussed of how arctic and antarctic seas whose production is dominated by very small organisms most of the year can efficiently sustain large concentrations of apex predators such as baleen whales, toothed whales, seals, fur seals, walruses, polar bears, and seabirds. It is suggested that although metabolism is slower in cold seawater, that is, near the freezing point at -2°C, the dynamic viscosity of seawater increases so that bacterivorous zooplankton filter feeders can influence water movement around themselves for much larger distances relative to their sizes than in warmer water where turbulent forces dominate. It is also suggested that especially in the Antarctic, salps, krill, and copepods provide an efficient transfer from small producers to apex predators.

B-55435

Laybourn-Parry, J., Bayliss, P., **Seasonal dynamics of the planktonic community in Lake Druzhby, Princess Elizabeth Land, eastern Antarctica,** *Freshwater biology,* Feb. 1996, 35(1), p.57-67, 55 refs.

The temporal abundance and composition of the plankton of a continental antarctic lake (Lake Druzhby) situated in the Vestfold Hills, East Antarctica was investigated from Dec. 1992 to Dec. 1993. The system was dominated by microbial plankton (cyanobacteria, heterotrophic bacteria and protozoans) with few metazoans. Chlorophyll *a* concentrations showed highest levels from late winter to spring. Mean bacterial biovolumes showed considerable seasonal variation. Largest biovolumes occurred in summer and this was the time of highest community biomass. Heterotrophic nanoflagellates reached highest abundances in late summer. Ciliated protozoa were poorly represented and sparse. Phototrophic nanoflagellates were sparse in this lake; instead the phototrophic plankton was dominated by a small rod-shaped cyanobacterium which constituted the largest carbon pool in the system. The carbon pools were derived from autochthonous sources. This lake system is driven by bottom-up forces and lacks top-down control, which fits into the picture currently seen for continental antarctic lakes. (Auth. mod.)

B-55442

Wilske, J., Arnbom, T., **Seasonal variation in vitamin D metabolites in southern elephant seal (*Mirounga leonina*) females at South Georgia,** *Comparative biochemistry and physiology,* May 1996, 114A(1), p.9-14, 36 refs.

Southern elephant seals spend two periods on land each year, during breeding and moult, exposed to intensive UV radiation. The time between periods on land are spent at sea, with little exposure to the sun. A study of serum 25-OH-D$_3$ and 1.25(OH)$_2$-D$_3$ on southern elephant seals was carried out at South Georgia. Samples were collected on four different occasions: early and late breeding, and early and late moult. The levels of 25-OH-D$_3$ increased when seals were on land, and decreased when at sea. Two annual peaks of 25-OH-D$_3$ were found, both of which immediately followed periods of intensive exposure of UV radiation. 1.25(OH)$_2$-D$_3$ levels showed a seasonal variation, but no significant changes while seals were on land were detected. The diving behavior at sea for southern elephant seals and no detectable change in 25-OH-D$_3$ indicates that the seals feed on prey containing vitamin D. (Auth.)

B-55445

Hirasawa, T., ed, NIPR Symposium on Polar Biology, 17th, Tokyo, Dec. 7-9, 1994, **Proceedings of the NIPR Symposium on Polar Biology, No.9,** Tokyo, National Institute of Polar Research, Feb. 1996, 348p., Refs. passim. For selected papers see B-55446 through B-55464 or 50-6030 through 50-6037.

This volume is a compilation of 29 full length papers, 19 of which are pertinent to Antarctica, presented at the 17th Symposium on Polar Biology held in Tokyo on Dec. 7-9, 1994. The aim of the Symposium was to introduce new results obtained in the polar region covering marine and terrestrial biology. The main theme of the Symposium was sea ice ecology, particularly the ice algae in Antarctica. The program of the Symposium and an author index conclude the volume.

B-55446

Horner, R.A., **Ice algal investigations: historical perspective,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.1-12, Refs. p.7-12.

Organisms that live in sea ice have been known and studied for over 150 years. The earliest studies were done on samples collected during voyages of exploration and are mainly lists of species. Experimental investigations began in the 1960s and in the subsequent 20 years consisted primarily of pioneering studies on primary productivity, biomass, spatial and temporal distributions, and composition and abundance of the biota. By the 1980s, there were better techniques for measuring primary productivity and biomass and more emphasis was placed on physiological studies. Much of this work was done from shore-based stations. In the late 1970s, ice-breaking or ice-strengthened research vessels became available and since then, large multi-disciplinary investigations involving biologists, ice physicists and chemists have worked mostly in the marginal seas of polar regions. Drifting ice floe and ice island stations have provided information from the central Arctic Ocean since the 1930s, and in 1992 from the Weddell Sea. (Auth.)

B-55447

Hoshiai, T., Tanimura, A., Kudoh, S., **Significance of autumnal sea ice biota in the ecosystem of ice-covered polar seas,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.27-34, Refs. p.33-34.

Autumnal sea ice proliferation occurs at Showa Station. The algal cells produced support the ice meiofauna and possibly planktonic and benthic consumers. However, the autumnal bloom of ice algae has received little attention from polar biologists during a long-term history of sea ice biota research. The geographical distribution and ecological importance and function of the autumnal ice algal community are reviewed here and compared with the spring ice community. (Auth.)

B-55448

Ackley, S.F., Fritsen, C.H., Lytle, V.I., Sullivan, C.W., **Freezing driven upwelling in antarctic sea ice biological systems,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.45-59, 23 refs.

Within existing ice covers, fluid motion can also be driven by freezing-induced convection. Surface snow-slush and near-surface highly porous layers were found in the pack ice at Ice Station Weddell in the western Weddell Sea at the end of summer and examined for physical and biological processes. Convective fluid motion, driven by brine rejection from the ice freezing from above as air temperatures dropped, replaced nutrient depleted waters in the layers with nutrient-rich sea water from below. The upwelling nutrients fueled autumn blooms of algae in second-year ice in the near surface regions of the ice cover where sufficient light is also available. Both the timing and location of these blooms within the ice cover are unlike the bottom spring blooms of sea ice algae previously observed. (Auth.)

B-55449

Legendre, L., **Biological CO_2 pump in seasonally ice-covered waters,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.61-74, Refs. p.71-74.

Pools of biogenic carbon in oceans have been defined by reference to the time elapsed between the photosynthetic uptake of carbon and its return as carbon dioxide to surface waters or the atmosphere (i.e. turnover time). In these waters there is a wide array of pathways that channel 3 size classes of primary production into long-lived and sequestered biogenic carbon. Biogenic carbon is often actively transferred from ice algae to large metazoans. Small biogenic particles can escape the short-lived carbon pool through grazing by microphagous zooplankton such as pteropods, doliolids, appendicularians and antarctic krill, or through incorporation into organic aggregates. In addition, there are direct and indirect sedimentation pathways for ice-related algae. The alternation between biological pumping of CO_2 during the ice-free season and algal carbon uptake during the ice-covered period creates unique conditions for the potential sequestration of atmospheric CO_2. (Auth. mod.)

B-55450

Marchant, H.J., Watanabe, K., Kawachi, M., **Marine snow in antarctic coastal waters,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.75-83, Refs. p 82-83.

The abundance of marine snow in antarctic coastal waters was investigated by using a video camera on a remotely operated vehicle in the 1991-92 summer. In the 1993-94 summer, marine snow was collected by divers near Showa Station to investigate the species composition of the constituent organisms and their Enrichment Factor (defined as the concentration of organisms in marine snow divided by their concentration in the adjacent water devoid of marine snow). The abundance of marine snow aggregates >1 mm differed widely from <0.1/l to >10/l. Marine snow collected in mid Jan. 1994 consisted principally of diatoms and mucilage derived from the sea-ice community while the collections made at the end of that month contained much colonial *Phaeocystis*. The Enrichment Factor was around 10 for bacteria and varied from around 200 to over 600 for eukaryotic protists. The abundance of polysaccharide-containing particles remained approximately constant during Jan. and early Feb. but the size of these particles increased during this time, reflecting an increase in the abundance of large colonies of *Phaeocystis*. (Auth. mod.)

B-55451

Spindler, M., **On the salinity tolerance of the planktonic foraminifer *Neogloboquadrina pachyderma* from antarctic sea ice,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.85-91, Refs. p.90-91.

The sea ice of both polar regions contains an internal system of delicate brine channels and pockets which serve as a habitat for a variety of organisms including plants and animals. The large standing stock of algae in the ice provides an ample food source for heterotrophic consumers. The sea ice habitat is characterized by low temperatures and correspondingly high salinities. During winter, temperatures as low as -15°C and salinities as high as 177 psu have been recorded in the brine channel system of the upper part of antarctic sea ice. The tolerance of sympagic organisms to such increased salinities is remarkable. Algae grow in salinities of up to 95 psu and also sea ice animals can survive, grow and partly reproduce under high salinities. The foraminifer *Neogloboquadrina pachyderma* was subjected to a variety of different salinities. Reproduction was never observed in salinities above 50 psu, which corroborates earlier results that *N. pachyderma* does not reproduce within the sea ice. (Auth. mod.)

B-55452

Igarashi, A., Numanami, H., Tsuchiya, Y., Fukuchi, M., **Occurrence and distribution of the planktonic foraminifer *Neogloboquadrina pachyderma* within annual and perennial sea ice of the eastern part of Lützow-Holm Bay, Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.93-110, 18 refs.

At Station A-5, situated about 3 km east of Showa Station, the planktonic foraminifer *Neogloboquadrina pachyderma* with cytoplasm is present mainly within sections between 20 and 40 cm from the top of ice cores. At Station A-2, located near Showa Station, they are confined predominantly to the lowermost 50 cm sections of the cores. At Station D, located about 20 km west of Showa Station, they are distributed maximally within sections between 210 and 244 cm from the tops of the cores. Considering the vertical distribution of foraminifers within sea ice and the time of freezing of sea ice, the main time of foraminiferal incorporation is estimated to be from mid-Apr. to mid-May. The foraminifers probably congregate in the uppermost part of the water column in order to feed on abundant diatoms during spring and summer. Until the onset of ice formation from late Apr. to mid-May, they may still remain there and are likely to be accidentally incorporated into the sea ice. (Auth. mod.)

B-55453

Donachie, S.P., **Seasonal study of marine bacteria in Admiralty Bay (Antarctica),** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.111-124, Refs. p.122-124.

Bacterial numbers at standard depths (10/50, 100, 200, 300 and 400 m) in Admiralty Bay were determined from Apr. 1990 to Jan. 1991. Neither CFU (Colony Forming Units on nutrient media, ca. 10^3/l), nor total bacteria (AODC-Acridine Orange Direct Count, ca. 10^7/l) numbers varied significantly over the 400 m water column; temporal variation was low, and means and ranges decreased with depth. Significantly more CFU were isolated from 100 m and 200 m after incubation at 15°C than 1°C ($p<0.05$). Close inshore in Half Moon Cove, bacterial numbers at 5 and 10 m depth were similar to those at the bay's center; significantly more CFU were also isolated here after incubation at 15°C. Mean cell volume and biomass in the upper 100 m was 0.228 μm^3 (n=1636), and 50.63 fg C/cell respectively. Bacterial carbon in the upper 100 m (mean 3.415 microg C/l) ranged widely. Rods dominated the total bacteria in most samples. (Auth. mod.)

B-55454

Odate, T., Fukuchi, M., **Differences in development of summer phytoplankton bloom under fast ice around Syowa Station, Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.125-130, 14 refs.

Temporal changes in phytoplankton abundance under antarctic fast ice were investigated at 3 sites around Showa Station from Jan. 5 to Feb. 6, 1992: in the western part of Ongul Strait (Station A) and in Kita-no-ura Cove (Stations B and C). Fast ice was thicker and snow coverage was heavier in the last 2 sites. Prominent blooms were observed at both areas when air temperature increased. Chlorophyll *a* abundance within the 5-30 m water column rapidly increased from Jan. 12 to 17 and reached a maximum of 226 mg/m^2 at Station A; the increase was more gradual at Stations B and C. The maximum abundances occurred on Jan. 21-23 at Stations B and C, and corresponded to 65 and 53% of the maximum at Station A, respectively. The observed difference in bloom development seems to result from light availability, which was affected by ice and its condition. (Auth.)

B-55455

Ho, J.S., Takeuchi, I., **Systematic status of *Eubrachiella*, a genus of copepoda parasitic on antarctic teleosts,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.169-177, 15 refs.

Studies on the newly collected materials of *Eubrachiella antarctica* (Quidor, 1906) from *Dissostichus eleginoides* near Heard I. and *E. gaini dorsituberculata* Kabata and Gusev, 1977 from *Trematomus bernacchii* taken from Lützow-Holm Bay, revealed the necessity of reconsideration of the systematic status of the genus and removing from it two nominal species: *E. sublobulata* Barnard, 1955 and *E. mugilis* Kabata et al., 1971. History and systematics of the genus *Eubrachiella* Wilson, 1915 are discussed in detail and a new diagnosis of the genus is proposed. With this new treatment, copepods of the genus *Eubrachiella* become more homogeneous and at the same time show strong preference for parasitism on antarctic fishes of the Bathydraconidae, Channichthyidae, and Nototheniidae. (Auth.)

B-55456

Komai, T., Takeuchi, I., Takeda, M., **Deep-sea shrimp (Crustacea: Decapoda: Caridea) from the antarctic sea collected during the JARE-35 cruise,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.179-206, Refs. p.205-206.

This paper reports on four deep-sea species of caridean shrimp collected during the JARE-35 cruise in the Indian Ocean sector of the antarctic ocean: *Nematocarcinus lanceopes* Bate, 1888 (Nematocarcinidae); *Chorismus antarcticus* (Pfeffer, 1887) (Hippolytidae); *Lebbeus antarcticus* (Hale, 1941) (Hippolytidae); *Notocrangon antarcticus* (Pfeffer, 1887) (Crangonidae). A small collection taken during the JARE-26 cruise, containing *C. antarcticus* and *N. antarcticus,* is also included. The identification of the present specimens with *N. lanceopes* was confirmed in comparison with the syntypes. Eight of 40 syntypes of *Acanthephyra antarctica* Bage, 1938 were reexamined; identity with *N. lanceopes* was confirmed. Three syntypes, one male and two females of *N. lanceopes,* are described; other material enabled the authors to complete the description of *N. lanceopes.* Three other species are described and illustrated in detail to supplement previous knowledge on morphology of these species. (Auth.)

B-55457

Numanami, H., et al, **Record of gastropods and bivalves collected from East Antarctica by the Japanese Antarctic Research Expedition in 1992-94,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.207-223, Refs. p.214-215.

Benthic mollusca were collected with baited traps and by scuba diving near Showa Station, and with a beam-trawl at 9 stations in Lützow-Holm, Casey and Prydz Bays. Around Showa Station, 7 gastropods and 3 bivalves were collected. Large specimens collected with the beam-trawl include 8 gastropods and 3 bivalves from Lützow-Holm Bay, 7 gastropods from Casey Bay and 2 gastropods and 4 bivalves from Prydz Bay. Almost all species have circum-antarctic distribution. Among them *Aforia multispirallis* (Turridae), which had hitherto been reported from the South Orkney Is., the South Shetland Is. and the Antarctic Peninsula, was collected from Prydz Bay for the first time. This indicates that the distribution of the species is extended further eastward than previous records indicate. The species composition of the present collections represents a typical shelf fauna in Antarctica. (Auth.)

B-55458

Iwami, T., Numanami, H., Naito, Y., **Behavior of three species of the family Artedidraconidae (Pisces, Notothenioidei), with reference to feeding,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.225-230, 8 refs.

Feeding behavior of 3 species of the antarctic fishes Artedidraconidae, *Artedidraco skottsbergi, Histiodraco velifer* and *Pogonophryne marmorata* was observed in a laboratory. *H. velifer* and *P. marmorata* responded to touching their mental barbel with fresh krill and their feeding behavior seemed to be evoked with the stimuli received by the barbel in the light condition. The observed motion of the barbel likely indicated that the barbel of the two species of artedidraconids functioned as an antenna or a sensor to perceive prey organisms. *A. skottsbergi* did not show any action responding to the prey supplied in a tank. (Auth.)

B-55459

Sakurai, H., et al, **Habitats of fish end epibenthic invertebrates in Fildes Bay, King George Island, Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.231-242, 12 refs.

From 1991 to 1993 the authors conducted underwater observations on communities of fish and epibenthic invertebrates four times during the austral summer in Fildes Bay on King George I. Eight distinctive habitat types were defined in the inshore areas (depths between 0 and 40 m), each having a characteristic community of fish and epibenthic invertebrates. Species compositions of animal communities varied according to the bottom substrates, depths and the presence or absence of macroalgal colonies. The habitat types of the major animal species are described, and characteristics of each habitat type and its faunal composition are noted. (Auth.)

B-55460

Tada, S., Sato, T., Sakurai, H., Arai, H., Kimpara, I., Kodama, M., **Benthos and fish community associated with clumps of submerged drifting algae in Fildes Bay, King George Island, Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.243-251, 13 refs.

The authors conducted a quantitative study of an animal community associated with clumps of submerged drifting algae on a sand/mud bottom at Fildes Bay. The algae clumps were found at depths between 5 and 20 m in the inner part of the bay. The clumps mainly consisted of *Desmarestia anceps* covering about 5% of the bottom. A large number of a nemertinean (0-220 individuals/m^2), *Nacella concina* (0-65 individuals/m^2), *Glyptonotus antarcticus* adults (0-8 individuals/m^2), juvenile (0-80 individuals/m^2) and gammaridean amphipods (490-25,020 individuals/m^2) were found associated with the clumps. Schools of *Trematomus newnesi* young (0-18 individuals/m^2) hovered over the clumps. Stomach contents of *T. newnesi* consisted mainly of gammaridean amphipods. The algae clump seemed to be an important habitat as a nursery ground for *G. antarcticus* and *T. newnesi.* (Auth.)

B-55461

Yamamoto, Y., Kanesaki, S., Kuramochi, T., Miyazaki, N., Watanuki, Y., Naito, Y., **Comparison of trace element concentrations in tissues of the chick and adult Adélie penguins,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.253-262, Refs. p.261-262.

Concentrations of Cd, Cu, Zn, Hg, Pb, Se, Mn and Fe were measured in livers, kidneys, muscles, skin and feathers collected from 12 chicks and 11 adult Adélie penguins captured at Cape Hinode and in Hukuro Cove from Jan. 1 to Feb. 9, 1991. Antarctic krill *(Euphausia superba)* collected from the stomach content of adult penguins were also analyzed, showing high accumulation of Fe and Pb. Higher concentrations of heavy metals were found in the liver and kidney than in other tissues. Cadmium and Hg concentrations in the liver, kidney, muscle and skin of the penguins increased with growth, suggesting that Cd and Hg were accumulated in the body through food. The Fe concentrations of adults were significantly higher in both pectoral and femoral muscles than those of the chicks. The conversion ratios of Hg concentrations among feather, liver and pectoral muscle of the adults were calculated at 3:5:1. A comparison of heavy metals in adult Adélie penguins captured in 1981 with those in 1991 indicates that both Hg and Pb concentrations in liver, kidney, muscles and skin of the 1991 samples were clearly higher than those of the 1981 samples. (Auth. mod.)

B-55462
Matsumoto, G.I., Yamada, S., Ohtani, S., Broady, P.A., Nagashima, H., **Biogeochemical features of hydrocarbons in cultured cyanobacteria and green algae from Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.275-282, 14 refs.

Hydrocarbons in cultured cyanobacteria *(Lyngbya murrayi, Oscillatoria priestleyi, Phormidium foveolarum, P. fragile, P. frigidum, P. laminosum, P. priestleyi* and *P. unicinatum)* and green algae *(Chlorella vulgaris, Chlorococcum* sp., *Cosmarium crenatum, C. speciosum, C. subcrenatum, Cosmarium* sp. and a species of Chlorococcales) from Antarctica were analyzed by the use of a gas chromatograph-mass spectrometer to determine their geochemical features and their biogeochemical significance. The presence of long-chain n-alkanes and n-alkenes in some cyanobacteria and green algae strongly suggests that these organisms are important sources of long-chain hydrocarbons in sedimentary and soil environments of Antarctica. The abundance of alkenes in cyanobacteria (75.7-98.0%) and green algae (88.2-100%) is probably due to the low incubation temperatures of cultures (10 or 15°C) and/or to adaptation to an extremely cold climate in Antarctica. The branched alkenes could be useful in chemotaxonomy of cyanobacteria. (Auth. mod.)

B-55463
Bölter, M., **Analysis of soil microbial communities (autotrophs and heterotrophs) from King George Island (Arctowski Station),** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.283-298, Refs. p.296-298.

Microbial communities of antarctic soils are analyzed with regard to their structures and compositions of microautotrophs and microheterotrophs. Size classes of bacteria and morphotypes of autotrophs are used as descriptors of samples from soils and plants. This matrix (31 samples x 37 descriptors) is clustered in R- and Q-modes. The clusters of samples are defined by their descriptors which have specific significance; several parameters, e.g. bacterial mean cell volume, fractions of rod shaped bacteria, can be used as discriminators for individual sites and their specific microbial communities. The results are discussed in relation to community studies of other sites. (Auth.)

B-55464
Olech, M., **Human impact on terrestrial ecosystems in West Antarctica,** NIPR Symposium on Polar Biology, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.299-306, 16 refs.

Examples of synathropization of flora in the South Shetlands Is. are presented. Investigations on man's impact were carried out between 1986 and 1993. Human impact on plant cover takes place in two parallel processes: some species (plantae hemerophobae) decrease their geographical range, as a result of direct and indirect habitat destruction; other extend their area of occurrence (plantae hemerophilae) due to man's activity. The latter process is a consequence of introduction of anthropophytes *(e.g. Lecidella elaeochroma, Lecanora symmicta* and *Poa annua)* or creation of man-made habitats suitable for the native species (apophytes) colonization *e.g. Muriella terrestris, Prasiola crispa, Acarospora macrocyclos, Amandinea coniops, Caloplaca citrina, C. sublobulata, Physica caesia, Xanthoria candelaria* and *Tortula grossiretis)..* (Auth.)

B-55465
Kosobokova, K.N., **Egg production of *Calanus propinquus* in laboratory conditions** [Eksperimental'noe izuchenie plodovitosti antarkicheskoĭ kopepody *Calanus propinquus*], *Okeanologiia,* Jan.-Feb. 1992, 32(1), p.134-140, In Russian with English summary. 15 refs.

Egg production of the copepod *Calanus propinquus* in the laboratory was measured for the first time immediately after collection in the Antarctic by the R.V. *Dmitry Mendeleev* in Feb.-Apr. 1989. Single females were kept at 0°C with a super-abundant food concentration (>500 cells/ml) of the diatom *Plathymonas viridis.* The females were laying eggs over 5 to 53 d. They released a clutch every two-three days. Mean spawning interval was 3.2 d; most clutches contained 10 to 40 eggs. Mean egg production rate of all females was 17 egg/female/day, corresponding to 1.4% body C per day. Carbon content of eggs was 0.37 microg/egg. The highest number of eggs spawned by a single female was 719, corresponding to 57.8% body C. The results suggest that the reproductive period of *C. propinquus* in the region under study starts in Dec. and lasts for 1.5-3 months. (Auth.)

B-55466
Makarov, R.R., Men'shenina, L.L., Soliankin, E.V., **Euphausiid larvae in the eastern Weddell Gyre** [Lichinki evfauziid v vostochnoĭ chasti krugovorota Ueddella], *Okeanologiia,* Mar.-Apr. 1992, 32(2), p.276-284, In Russian with English summary. 19 refs.

Fauna, abundance and stage-composition of euphausiid larvae were investigated in the eastern Weddell Gyre in Feb., 1988. All species of larvae (excluding *Euphausia crystallorophias)* were caught there. Presence of low-latitudinal species larvae, *E. frigida* in cold, high-latitudinal waters of the Weddell Sea (in the northern periphery of the Weddell Gyre) was due to its distribution inside of the secondary frontal zone (between waters of Antarctic Circumpolar Current (ACC) and the Weddell Sea). In the Weddell Sea waters, only larvae of *Thysanoessa macrura* and *E. superba* were found. For the period of observation, the abundance of euphausiid larvae was highest in ACC waters and the lowest in Weddell Sea waters. No mass appearance of *E. superba* in the plankton was recorded during the survey. In waters of Weddell Warm Countercurrent, south of Weddell Gyre, and in ACC waters, *T. macrura* starts to spawn earlier than in waters of the Weddell Gyre. (Auth. mod.)

B-55467
Fedotov, A.S., **Euphausiid larvae in the Antarctic Circumpolar Current-Weddell Sea Confluence Zone in winter** [Lichinki eufauziid zimoĭ v vostochnoĭ chasti zony sliianiia vod Antarkticheskogo tsirkumpoliarnogo techeniia i vod moria Ueddella], *Okeanologiia,* Mar.-Apr. 1992, 32(2), p.285-292, In Russian with English summary. 17 refs.

In June 1982, the distribution, abundance and age composition of euphausiid larvae were determined in different types of antarctic waters. Larvae of *Euphausia triacantha* and *E. frigida* were caught only in the Antarctic Circumpolar Current (ACC) waters; larvae of *E. superba* and *Thysanoessa macrura* were found in the ACC and the Weddell Sea waters. Larvae of *E. frigida* and *E. superba* were most abundant in gyre structures within the current fields of the secondary frontal zone. A delay was observed in euphausiid spawning season in ACC waters *(E. frigida* and *E. superba),* as well as in Weddell Sea waters *(E. superba).* The spawning season of *E. superba* in the Weddell Sea was short, while in ACC waters it lasted longer. It is assumed that the oceanic spawning of *E. superba,* which takes place in the eastern part of ACC-Weddell Confluence Zone, is important for the reproduction and the recruitment of krill stock in the Atlantic sector of the Antarctic. (Auth. mod.)

B-55469
Fowbert, J.A., **Experimental study of growth in relation to morphology and shoot water content in maritime antarctic mosses,** *New phytologist,* June 1996, 133(2), p.363-373, 37 refs.

The dependence of shoot growth and growth form on water availability was studied experimentally in six species of maritime antarctic moss. Under all conditions the largest growth increments were observed in the hydric species *Brachythecium austro-salebrosum* and *Drepanocladus uncinatus.* Lateral shoot production varied within and between species. Over 50% of the biomass produced in *D. uncinatus* was derived from lateral shoot production, whereas *Polytrichum alpestre* produced very few lateral shoots and *A. depressinervis* produced none. Leaf density and leaf size also varied with total water content. In all species, growth ceased at total water contents of 100% d. wt or less. However, the total water content at which maximum growth was observed differed between species. Optimum total water contents for growth were greater than those at full turgor and published optima for net assimilation. Growth and total water content of these antarctic mosses were similar to those reported for temperate species. (Auth. mod.)

B-55470
Scientific Committee for the Conservation of Antarctic Marine Living Resources, **Report of the Fourteenth Meeting of the Scientific Committee, Hobart, Australia, 23-27 October, 1995,** Hobart, Tasmania, CCAMLR, 1995, 459p., Refs. passim.

This document presents the adopted record of the Fourteenth Meeting of the Scientific Committee for the Conservation of Antarctic Marine Living Resources held in Hobart, Australia Oct. 23-27, 1995. Major topics discussed include: the CCAMLR ecosystem monitoring program, krill, fish, crab and squid resources, marine mammal and bird populations, assessment of incidental mortality, ecosystem monitoring and management, and management under conditions of uncertainty. Reports of meetings and intersessional activities of subsidiary bodies of the Scientific Committee, including the Working Groups on Ecosystem Monitoring and Management and on Fish Stock Assessment, are appended. (Auth.)

B-55471

Commission for the Conservation of Antarctic Marine Living Resources, **Report of the Fourteenth Meeting of the Commission, Hobart, Australia, 24 October-3 November, 1995,** Hobart, Tasmania, CCAMLR, 1995, 153p.

This document presents the adopted record of the Fourteenth Meeting of the Commission for the Conservation of Antarctic Marine Living Resources held in Hobart, Australia from Oct. 24 to Nov. 3, 1995. Major topics discussed include: review of the Report of the Scientific Committee, assessment and avoidance of incidental mortality of antarctic marine living resources, current operation of the Systems of Inspection and Scientific Observation, compliance with conservation measures in force, review of existing conservation measures and adoption of new conservation measures including catch limitations for a number of species of finfish and for antarctic crabs, management under conditions of uncertainty and cooperation with other international organizations including the Antarctic Treaty System. The Reports of the Standing Committee on Administration and Finance and the Standing Committee on Observation and Inspection are appended. (Auth.)

B-55481

Eklund, C.R., **Antarctic fauna and some of its problems,** Antarctica in the International Geophysical Year. Geophysical monograph no.1, Washington, D.C., [American Geophysical Union], 1956, p.117-123, 33 refs.

Distribution of birds, mammals, fishes, and other forms of animal life common to the antarctic region are discussed briefly. These include the emperor and Adélie penguins, and the south polar skua, which species are considered indigenous to the area. Other bird species which either nest or spend considerable time in the region are mentioned. The four pinnipedia considered endemic to the antarctic zone are the Ross, crabeater, Weddell, and leopard seals, and their habits are cited. Occurrence of marine invertebrates and fishes is shown by phylum, class, or order. Terrestrial fauna consists primarily of arthropods. References are made to some of the past zoological studies, and the inadequacies of the present knowledge of antarctic animals are considered. A zoological program which might be coordinated with geophysical studies is suggested. This includes collecting, bird banding, seal marking, life-history habits, population dynamics, food habits, seasonal movements, physiological studies, and location of the breeding grounds of the Ross and crabeater seals. (Auth.)

B-55482

Guella, G., Dini, F., Pietra, F., **Epoxyfocardin and its putative biogenetic precursor, focardin: bioactive, new-skeleton diterpenoids of the marine ciliate *Euplotes focardii* from Antarctica,** *Helvetica chimica acta,* 1996, 79(2), p.439-448, 12 refs.

From the ciliate *Euplotes focardii,* collected from Ross Sea coastal waters, a new-skeleton diterpenoid, epoxyfocardin, was isolated as a 85:15 mixture of hemiacetals 8a and 8b. The absolute configuration of 8a/8b was determined from *Mosher's* esters 11a/11b and 12a/12b. Focardin 9a/9b, most likely a biogenetic precursor of 8a/8b, was also isolated as a minor component. Focardin, and particularly epoxyfocardin, proved to be toxic towards representatives of ciliate communities from antarctic, temperate, tropical, and equatorial environments, constituting the first example of ecologically relevant metabolites from ciliate species that inhabit polar ecosystems. (Auth.)

B-55483

Bartsch, I., Faubel, A., ***Protomyzostomum glanduliferum* n. sp., a new myzostomid from the antarctic ophiuroid *Ophiacantha disjuncta*,** *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1995, Vol.92, p.35-43, With German summary. 18 refs.

DLC QL1.H23 1995

Ophiacantha disjuncta (Koehler) (Ophiacanthidae, Ophiuroidea) from the Weddell Sea was found to be infested with the endoparasitic myzostomid *Protomyzostomum glanduliferum.* The myzostomid is described. The worms generally live in the ventral coelom, above the jaws and the basal arm vertebrae. About 50% of the brittle star population was infested, with one to six myzostomids per host. In several but not in all of the ophiacanthids infested, the stomach wall and stomach pouches were reduced, causing the brittle stars to starve. (Auth.)

B-55484

Jab/bński, B., **Distribution, abundance and biology of the antarctic tern *Sterna vittata* Gmelin, 1789 on King George Island (South Shetland Islands),** *Acta zoologica cracoviensia,* Dec. 29, 1995, 38(3), p.399-460, Refs. p.457-460.

A total of 3518 pairs of antarctic terns nested on King George I. in the 1980-81 season. In the region of Admiralty Bay the numbers ranged from 652 to 1828 pairs (7.2-20.1 pairs/km of coastline). Most pairs nested on rock-rubble heaps devoid of vegetation or on moraines. On the average 1.45 eggs, 0.46 newly hatched chicks and 0.22 young birds leaving the colony fell to one pair. Mean dimensions calculated from 498 eggs were 44.8 x 33.5 mm. Single eggs, and the first ones of two-egg clutches, were longer. The first chicks grew faster. The diet of adult and young birds consisted of *Euphausia,* Amphipoda and Pisces. Their proportions in the food of the young changed with age. The total consumption of krill by antarctic terns in the region of Admiralty Bay was 4.69-4.93 tons in the 1980-81 season, which makes 0.60-0.78% of its biomass. (Auth. mod.)

B-55485

Hartmann, G., **Antarctic benthic ostracods II. Part 2: Elephant I. and Bransfield Strait** [Antarktische benthische Ostracoden II. Auswertung der Fahrten der "Polarstern" Ant. III/2 und der Reisen der "Walther Herwig" 68/1 und 2. 2. Teil: Elephant Island und Bransfield Straße], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1987, Vol.84, p.115-156, In German with English summary. 3 refs.

DLC QL1.H23 1987

The paper presented is the second part of a study on ostracods collected during the voyages of the R.V. *Polarstern* and *Walther Herwig* in Nov. and Dec. 1984 and Feb. to Apr. 1985. The taxonomic part deals with 41 species of benthic ostracods; 5 are new to science and are described. (Auth. mod.)

B-55486

Hernández, D.A., ***Trachythyone baja* sp. n., a new species from antarctic waters (Echinodermata: Holothurioidea),** *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1987, Vol.84, p.161-165, With German summary. 9 refs.

DLC QL1.H23 1987

Nine species of the cosmopolitan genus *Trachythyone* Studer, 1876 occur in the Southern Hemisphere. *Trachythyone baja* n.sp. from the Antarctic Peninsula and South Georgia is described in this paper. Its relationship to *T. parva* and *T. squamata* is discussed. (Auth. mod.)

B-55487

Hartmann-Schröder, G., Rosenfeldt, P., **Polychaetes collected by "Polarstern" antarctic cruise in 1984** [Die Polichaeten der "Polarstern" - Reise ANT III/2 in die Antarktis 1984. Teil 1: Euphrosinidae bis Chaetopteridae], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1988, Vol.85, p.25-72, In German with English summary. Refs. p.60-62.

DLC QL1.H23 1988

The paper presented deals with 17 families of polychaetes collected during the antarctic voyage of R/V *Polarstern* from Nov. 19 to Dec. 4, 1984. Sixty-six species were found, 47 of which were already known. Ten species *(Lacydonia antarctica, Sphaerosyllis joinvillensis, Exogone obtusa, Ceratonereis (Composetia) antarctica, Ephesiella mühlenhardtae, Sphaerodoropsis arctowskyensis, Sphaerodoropsis polypapillata, Aricidea (Allia) antarctica, Cirrophorus brunneus, Apistobranchus gudru-*

nae) and two subspecies *(Sphaerosyllis lateropapillata uteae* and *Exogone heterosetoides australis)*, were new to science and are described. Seven species could not be determined to species level. Forty-four of the 47 known species were already recorded from Antarctica. The biggest group (17 species) is distributed in the antarctic/subantarctic region as well as in the southern parts of South America. Six species are endemic to Antarctica, 5 species to Antarctica/Subantarctica. (Auth. mod.)

B-55488

Andres, H.G., **Two new acanthonotozomatids from the Bransfield Strait** [Zwei neue Acanthonotozomatiden aus der Bransfield Straße, Antarktis (Crustacea: Amphipoda)], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1988, Vol.85, p.111-120, In German with English summary. 4 refs.

DLC QL1.H23 1988

Two acanthonotozomatids, *Imphimediella paracuticoxa* n.sp and *Parapanoploea recessa* n.sp. from the Bransfield Strait, are described and illustrated. (Auth. mod.)

B-55489

Coleman, O., Andres, H.G., **New *Echiniphimedia* species from Antarctica** [Neue Echiniphimedia-Arten aus der Antarktis (Crustacea: Amphipoda: Acanthonotozomatidae)], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1988, Vol.85, p.121-140, In German with English summary. 7 refs.

DLC QL1.H23 1988

Samples of benthic *Echiniphimedia* species were collected during the RV *Polarstern* antarctic expeditions of 1982-83 and 1984-85. The gammaridean material included 3 new species: *Echiniphimedia gabrielae, E. waegelei* and *E. barnardi.* Their taxonomic and morphological features are discussed. (Auth. mod.)

B-55490

Hartmann, G., **Antarctic benthic ostracods 3: from South Orkney Is.** [Antarktische benthische Ostracoden III. Auswertung der Reise des FFS "Walther Herwig" 68/1. 3. Teil: Süd-Orkney-Inseln], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1988, Vol.85, p.141-162, In German with English summary. 4 refs.

DLC QL1.H23 1988

The paper presented deals with ostracods collected during the cruise of R.V. *Walther Herwig* in Jan.-Feb., 1985 in waters around the South Orkney Is. It is pointed out that these samples contained ostracods of subantarctic distribution, like those from the northern tip of the Antarctic Peninsula, which were not found around the South Shetland Is. nor in the Bransfield Strait. The taxonomy of 32 species is discussed, 25 of which were known to science, including 5 in open nomenclature and 2 new species which are described and illustrated. (Auth. mod.)

B-55491

Hartmann-Schröder, G., Rosenfeldt, P., **Antarctic polychaetes in 1984: Cirratulidae to Serpulidae** [Die Polychaeten der "Polarstern"-Reise ANT III/2 in die Antarktis 1984. Teil 2: Cirratulidae bis Serpulidae], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1989, Vol.86, p.65-106, In German with English summary. Refs. p.97-98.

DLC QL1.H23 1989

The paper presented deals with 13 families of polychaetes collected during the cruise of R/V *Polarstern* from Nov. 19 to Dec. 4, 1984. Seventy-eight species were found, 56 of which already known whereas 17 species and one new genus *(Eupraxillella,* Maldanidae) were new to science and have been described. Five species could not be determined to species level. Three of the known species are recorded from Antarctica for the first time: *?Caulleriella zetlandica, Ophelina cylindricaudata,* and *Proclea graffii.* Thirteen species of the 56 already known are distributed in the antarctic/subantarctic region as well as in the southern parts of South America. The same number of species has a bipolar distribution. The next biggest group of species (10) are cosmopolitans or are more widely distributed; 5 species are endemic to Antarctica, 8 are endemic to Antarctica/Subantarctica. (Auth. mod.)

B-55492

Mühlenhardt-Siegel, U., **Antarctic Bivalvia from 1984-1986 German cruises** [Antarktische Bivalvia der Reisen des FS "Polarstern" und des FFS "Walther Herwig" aus den Jahren 1984 bis 1986], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1989, Vol.86, p.153-178, In German with English summary. Refs. p.169-170.

DLC QL1.H23 1989

The bivalves of the 3 expeditions to the South Orkney and South Shetland islands and the western shelf of the Antarctic Peninsula from 1984 to 1986 were analyzed quantitatively. Additional qualitative data was also available from a 1987 cruise. The list of 30 known species from this area can be extended, because 44 species were found during this investigation, with 9 of them collected during the 1987 expedition. Comparison with literature data revealed a circumpolar distribution pattern for most species. Quantitative abundance and presence data are given for the first time, while further information is provided for depth distribution and sediment preference of the species. Habitus illustrations of each species are given. (Auth. mod.)

B-55493

Andres, H.G., ***Antatelson tuberculatum,* new species of Thaumatelson from Antarctica** [*Antatelson tuberculatum* sp. n., ein neuer Vertreter der Thaumatelsoninae aus der Antarktis (Crustacea: Amphipoda: Gammaridea)], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1989, Vol.86, p.179-184, In German with English summary. 5 refs.

DLC QL1.H23 1989

Antatelson tuberculatum sp. n. is described. The material was sampled by grabs near Elephant I. during the *Walther Herwig* cruise 68, 1984-85. The depth range of *A. tuberculatum* was 203 to 290 m; it was confined to muddy sand substrates. (Auth.)

B-55494

Hartmann, G., **Antarctic benthic ostracods 4: from South Georgia** [Antarktische benthische Ostracoden IV. Auswertung der während der Reise von FFS "Walther Herwig" (68/1) bei Süd-Georgien gesammelten Ostracoden], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1989, Vol.86, p.209-230, In German with English summary. 7 refs.

DLC QL1.H23 1989

The paper presented deals with ostracods collected during the cruise of R.V. *Walther Herwig* (68/1) in Jan. and Feb. 1985 in waters around South Georgia. The samples contained a number of species previously sampled near South Georgia and described by Skogsberg (1928). As this author studied only the ostracods with heavy shells, two new genera and four new species were identified. The ostracods include species with a subantarctic distribution, some extending their range into Patagonia, as well as species which were also found in high antarctic environments. The taxonomy deals with 33 species, 22 known to science, 7 in open nomenclature and 4 new species which are described. For two of new species, new genera have to be erected: *Austrocythere* and *Nodoconcha.* (Auth. mod.)

B-55495

Hartmann, G., **Benthic ostracods from Elephant I. and the Antarctic Peninsula** [Antarktische benthische Ostracoden V. Auswertung der Südwinterreise von FS "Polarstern" (Ps 9/V-1) im Bereich Elephant Island und der Antarktischen Halbinsel], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1989, Vol.86, p.231-288, In German with English summary. 13 refs.

DLC QL1.H23 1989

The winter cruise of F.S. *Polarstern* was the most successful so far for the collection of ostracods, with 56 species found. Of these, 7 are new to science, 3 have to remain in open nomenclature; the remaining 46 are already known. A new genus, *Pseudeucythere,* can also be erected based on the material collected. An important find is that 47 of the species carried eggs, embryos, or were represented by larvae, indicating that most of the antarctic ostracods also reproduce during winter. The remaining 9 species were only found in small numbers, from which it was not possible to decide if they were also undergoing reproduction. Data are presented indicating patchiness of distribution since it was possible to collect material in series of up to 6 grab samples of a single station. (Auth.)

B-55496

Hartmann-Schröder, G., Rosenfeldt, P., **Polychaetes from Elephant I., 1985: Acrocirridae to Sabellidae** [Die Polychaeten der "Walther Herwig"-Reise 68/1 nach Elephant Island (Antarktis) 1985. Teil 2: Acrocirridae bis Sabellidae], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1991, Vol.88, p.73-96, In German with English summary. 22 refs.

DLC QL1.H23 1991

The paper presented deals with 12 families of polychaetes collected during the cruise of FRV *Walther Herwig* from Feb. 21-27, 1985. Fifty-seven species were found: 52 were already known; 2 species are described as new: *Streblosoma variouncinatum* and *Oriopsis pulchra;* 3 species could not be determined to species level. Forty-five of the 52 known species were recorded by *Polarstern* cruise ANT III/2. Fourteen of the 52 known species are endemic to Antarctica, the biggest group by distribution. (Auth.)

B-55497

Dastych, H., **Redescription of *Hypsibius antarcticus* (Richters, 1904), with some notes on *Hypsibius arcticus* (Murray, 1907) (Tardigrada),** *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1991, Vol.88, p.141-159, With German summary. Refs. p.157-159.

DLC QL1.H23 1991

The tardigrade *Hypsibius antarcticus* (Richters, 1904) is redescribed based on type-material. Taxonomic confusion surrounding this species has resulted from inadequate original description and misleading additions (Richters 1904a, 1908a). All records of *H. antarcticus* from the Northern Hemisphere were verified and proved to be misidentifications. All records of another polar tardigrade, *H. arcticus* (Murray, 1907) from the Antarctic, have to be considered now as those of *H. antarcticus.* The taxonomic status of *H. arcticus* and its possible synonymy with *H. antarcticus* are discussed, but the question remains unsettled. (Auth.)

B-55498

Hartmann, G., **Antarctic benthic ostracods 7: from King George I.** [Antarktische benthische Ostracoden VII. Ostracoden aus dem Oberen Litoral von King George Island], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1991, Vol.88, p.211-220, In German with English summary. 2 refs.

DLC QL1.H23 1991

The paper presented deals with ostracods collected in the upper littoral of King George I. by diving and dredge sampling (1980-82, 1984-86). Forty-seven samples contained 22 ostracod species; 13 of these could be determined to species level and 9 remain in open nomenclature. Of the 13 species, one is a new record for Antarctica, known up to now only from the Kerguelen Is. Several species were more abundant in the upper littoral than in samples from deeper water obtained previously. (Auth.)

B-55499

Wrzesinski, O., Hartmann-Schröder, G., **Vegetative reproduction of polychaetes from Elephant I.** [Beobachtungen zur vegetativen Vermehrung bei *Maldane sarsi* Malmgren, 1865 (Maldanidae, Polychaeta) aus dem Gebiet von Elephant Island (Süd-Shetland-Inseln, Antarktis)], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1994, Vol.91, p.27-30, In German with English summary. 4 refs.

DLC QL1.H23 1994

Vegetative reproduction observed in several specimens of the polychaete *Maldane sarsi* collected during the 1986 winter cruise of R.V. *Polarstern* near Elephant I. is discussed. (Auth. mod.)

B-55500

Wrzesinski, O., Hartmann-Schröder, G., **New species of polychaete from Hope Bay** [*Euclymene pterocephala* sp.n., ein neuer Polychaet der Familie Maldanidae von Hope Bay (Antarktische Halbinsel)], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1994, Vol.91, p.31-33, In German with English summary. 2 refs.

DLC QL1.H23 1994

A new species of the maldanid family of polychaetes, *Euclymene pterocephala* n.sp. from Hope Bay, is described and illustrated.

B-55501

Hartmann, G., **Antarctic benthic ostracods. 10.** [Antarktische benthische Ostracoden X. Bemerkungen zur Gattung *Krithe* mit Beschreibung einer neuen Untergattung *Austrokrithe*], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1994, Vol.91, p.77-79, In German with English summary. 11 refs.

DLC QL1.H23 1994

The ostracod *Profundocythere magna* is closely related to *Krithe,* but differs from the latter and from the diagnoses of the entire family Krithidae in several ways: the respiratory plate of the maxillula has an "aberrant" Strahl, and the number of joints of the walking leg is different. In order to clarify the situation it is necessary to remove *Profundocythere* from the Krithidae and to place it into the Cytheridae; to extend the diagnoses for Krithidae with respect to the special characters of *Profundocythere magna;* and to define a new taxon in which to place *Profundocythere magna:* the subgenus *Austrokrithe* n.sp. (Auth. mod.)

B-55502

Hartmann, G., **Ostracods *Heterocyprideis sorbyana* found on Elephant I.** [Zum Fund von *Heterocyprideis sorbyana* (Jones, 1856) in der Antarktis. (Ein Beispiel bipolarer Verbreitung auf Spezies-Niveau)], *Hamburg. Zoologisches Museum und Institut. Mitteilungen,* Nov. 1994, Vol.91, p.89-90, In German with English summary. 5 refs.

DLC QL1.H23 1994

The discovery on Elephant I. of *Heterocyprideis sorbyana* (Jones, 1856), a species hitherto known as a typical arctic species with glacial relicts in the Baltic Sea, is reported, leading to a discussion on bipolar distribution of ostracods. (Auth. mod.)

B-55503

Liu, Q., Chen, D.G., **Length frequency analysis of *Pleuragramma antarcticum, Electrona antarctica, Protomyctophum bolini,*** *Chinese journal of oceanology and limnology,* 1995, 13(4), p.380-384, 9 refs.

British Antarctic Survey (BAS) data collected near the Antarctic Peninsula were used in this 1988-89 study on the length frequency of three antarctic fish species *(Pleuragramma antarcticum, Electrona antarctica* and *Protomyctophum bolini)* showing that the standard length (SL) of *P. antarcticum* ranged from 26.0 to 161.0 mm, that the 26.0 to 54.0 mm SL juveniles could be considered to be the age group 1 fish, and that the SL of *E. antarctica* ranged from 39.4 to 89.7 mm for the males and 48.0 to 118.0 mm for the females, which may contain at least 6 age groups. *P. bolini* had 29.2 to 60.2 mm SL and complicated age composition. (Auth. mod.)

B-55511

Fabiszewski, J., Wojtuń, B., **Moss peat-mounds on King George I.** [Pagórki torfowe na wyspie Króla Jerzego (Antarktyka)], *Wiadomości botaniczne,* 1993, 37(3-4), p.207-208, In Polish with English summary.

Moss peat-mounds found on King George I. reach 1.0 m in height, 13-15 m in diameter and are located 36 m a.s.l. They appear to have originated close to a penguin colony, since feathers of these birds are found at the bottom. Initially, the peat consists of *Calliergidium austro-stramineum,* then it is mixed with *Drepanocladus uncinatus* and *Polytrichum alpinum.* There is no trace of the characteristic peat-forming species which develop deep accumulations of peat moss elsewhere in the maritime Antarctic, i.e. *Chorisodontium aciphyllum* and *Polytrichum alpestre.* The surface of the banks is eroded and covered by living *Poytrichum alpinum, Drepanocladus uncinatus, Deschampsia antarctica* and various lichens. This suggests that the banks are now in a stagnant stage. Radiocarbon dating of peat from the base of these deposits suggests that they originated about 4090 years B.P. (Auth.)

B-55512

Olech, M., **Lichen flora and vegetation of the South Shetland Is.** [Flora porostów i szata roślinna Południowych Szetlandów (Antarktyka)], *Wiadomości botaniczne,* 1993, 37(3-4), p.209-211, In Polish with English summary. 18 refs.

Lichenological investigations in the South Shetland Is. were carried out during the Polish antarctic expeditions in 1986-1988 and in 1989-90. Ecological studies on antarctic terrestrial ecosystems were part of the BIOTAS program. The main studies on extinction and spatial distribution of lichen species were carried out on King George I. On Livingston I., vegetation maps and lists of species were prepared; 170 species from Admiralty Bay region, 104 from Lions Rump, and 150 from Livingston I. are reported. Among them, 110 are new to King George I., 110 are new to Livingston I., and 80 to the Southern Hemisphere. *Thelocarpon cyaneum*, a new species from King George I. is described. (Auth. mod.)

B-55513

Zarzycki, K., Barcikowski, A., **Terrestrial vegetation of King George Is.: ecology of plant communities and populations of vascular plants** [Roślinność lądowa regionu zatoki Admiralicji i zatoki Króla Jerzego (Wyspa Króla Jerzego, Szetlandy Południowe, Antarktyka) - problemy ekologii zbiorowisk i populacji roślin naczyniowych], *Wiadomości botaniczne,* 1993, 37(3-4), p.213-215, In Polish with English summary. 4 refs.

Investigations were carried out during the Polish antarctic expeditions in Jan. 1988 and from Dec. 1989 to Feb. 1990 in the vicinity of Arctowski Station. The studies concerned the floristic composition of the vegetation (transects and Braun-Blanquet method), biomass, chlorophyll *(a+b)* contents of different plant communities, detailed distribution and phenology, as well as population structure, of *Colobanthus quintensis* and *Deschampsia antarctica.* Samples of plants and soils were collected to determine the heavy metal content. (Auth. mod.)

B-55515

Utevskiĭ, A.IU., **New genus of antarctic piscicolid leeches (Hirudinea, Rhynchobdellida)** [Novyĭ rod antarkticheskikh piiavok semeĭstva Piscicolidae (Hirudinea, Rhynchobdellida)], *Vestnik zoologii,* 1994, No.4-5, p.73-76, In Russian with English and Ukrainian summaries. 3 refs.

Epsteinia gen. n. is established for the antarctic piscicolid leech *Trulliobdella alba* Epstein, 1970. An extended redescription of the type-species after holotype is given: from *T. capitis* Brinkmann, 1948 it differs by the body shape, absence of pulsatile vesicles, absence of papillae and ocelli on suckers, absence of ocelli on trachelosome, shape of crop and intestinal caeca, absence of posterior crop caeca, reproductive system structure, and absence of the conductive tissue. (Auth.)

B-55516

Mironov, A.N., **Holasteroid echinoids. 2. The genus *Pourtalesia*** [Kholasteroidnye morskie ezhi. 2. *Pourtalesia*], *Zoologicheskiĭ zhurnal,* Dec. 1995, 74(12), p.59-75, In Russian with English summary. Refs. p.74-75.

Nine species of sea urchins of the genus *Pourtalesia* including a new species from the Antarctic are identified from samples obtained by the Institute of Oceanography (Moscow). In addition, 5 species are not identified and appear to be new. *P. laguncula beringiana* is considered as a separate species. An analysis of literary data shows the incorrect identification of *P. miranda* from the northern Atlantic and *P. tanneri* from the northern Pacific. *P. aff. alcocki* is recorded from the northern Atlantic. Probably, antarctic *P. hispida* occurs in this region. A key is given to the species of *Pourtalesia.* (Auth.)

B-55525

Hays, L.M., Feeney, R.E., Crowe, L.M., Crowe, J.H., Oliver, A.E., **Antifreeze glycoproteins inhibit leakage from liposomes during thermotropic phase transitions,** *National Academy of Sciences—USA. Proceedings,* June 25, 1996, 93(13), p.6835-6840, 39 refs.

Antifreeze glycoproteins (AFGPs) found in the blood of antarctic fish are known to prevent ice crystal growth and depress the freezing temperature of the blood. Previously, Rubinsky et al. provided evidence that AFGPs block ion fluxes across membranes during cooling, an effect that they ascribed to interactions with ion channels. The authors investigated the effects of AFGPs on the leakage of a trapped marker from liposomes during chilling. As these liposomes are cooled through the transition temperature, they leak ca. 50% of their contents. Addition of less then 1 mg/ml of AFGP prevents up to 100% of this leakage, both during chilling and warming through the phase transition. This is a general effect that applies to liposomes composed of phospholipids with transition temperatures ranging from 12°C to 41°C. It is concluded that the stabilizing effects of AFGPs on intact cells during chilling reported by Rubinsky may be due to a nonspecific effect on the lipid components of native membranes. There are other proteins that prevent leakage, but only under specialized conditions. (Auth. mod.)

B-55526

Zdzitowiecki, K., Cielecka, D., **Morphology and occurrence of *Dichelyne (Cucullanellus) fraseri* (Baylis, 1929), a parasitic nematode of Antarctic and sub-Antarctic fishes,** *Acta parasitologica,* Jan. 1996, 41(1), p.30-37, 27 refs.

A total of 1414 antarctic bony fishes and 66 subantarctic ones were examined for nematodes. One species, *Dichelyne (Cucullanellus) fraseri* (Baylis, 1929), is redescribed and figured. *Dichelyne fraseri* var. *notothe-niae* (Baylis, 1929) is considered identical with the nominal form. Occurrence of *D. fraseri* is reported from South Georgia, the South Orkney Is. and the South Shetland Is., as well as from the Kerguelen Is. The species was also reported by various authors from the Magellanic subregion, but it is absent in the subcontinental waters (southern part of West Antarctica and the whole of East Antarctica). The species is associated with benthic and bentho-pelagic hosts. New host records are *Parachaenichthys georgianus, Notothenia angustifrons, N. neglecta, Nototheniops nudifrons* and *Trematomus vicarius.* All previous and present data are summarized. (Auth. mod.)

B-55532

Kerry, K., **Terrestrial flora and fauna of the AAT,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.53-74, Refs. p.68-74.

This chapter provides some of the biological information necessary for an understanding of the special needs for the conservation of the antarctic terrestrial biota. The fact that the biota is mostly cryptic and the species, their distribution and their abundance poorly documented, heightens the need for special consideration and research. It is seen as unfortunate that most people, including those who have visited Antarctica, perceive antarctic conservation to be synonymous with the protection of only the most visible of species, the seals and birds. This is a perception that must be changed if the unique antarctic ecosystems are to be protected in the long term.

B-55537

Grubor-Lajsic, G., Block, W., Jovanovic, A., Worland, R., **Antioxidant enzymes in larvae of the antarctic fly, *Belgica antarctica*,** *Cryo-letters,* Jan.-Feb. 1996, 17(1), p.39-42, 24 refs.

Activities of superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GSH-Px), glutathione reductase (GR) and glutathione-S-transferase (GST) as well as glutathione (GSH) concentration were analyzed in whole body homogenates of larvae of the antarctic fly *Belgica antarctica* (Diptera, Chironomidae). Significantly higher levels of SOD (0.44 units/min/mg protein) and CAT (6.54 units/min/mg protein) were obtained, compared with the same enzymes from larvae of two temperate insects, *Tipula paludosa* (Diptera, Tipulidae) and *Tenebrio molitor* (Coleoptera, Tenebrionidae). The antioxidant defense pattern found in *B. antarctica* suggests that its antioxidant capacity is adequate for the extreme environment in which the larvae live. (Auth.)

B-55538

Hovenden, M.J., Seppelt, R.D., **Uptake of water from the atmosphere by lichens in continental Antarctica,** *Symbiosis,* 1995, 18(2), p.111-118, 13 refs.

Microclimate relative humidity and temperature and lichen thallus temperature were measured from Aug. 1992 to Jan. 1993 at the crest of a hill on Clark Peninsula in the Windmill Is. The water potential of the air in the lichen microhabitat was modelled and compared with the water potential assumed to be necessary for lichen photosynthesis due to water vapor uptake. It was found that for most of the spring the atmospheric water potential was too low for water vapor uptake by exposed lichen. In all there were only 351 h during which water vapor uptake could have occurred, most of this falling in Nov. The results indicate that water vapor uptake by exposed lichen will occur during the period of snowmelt at the beginning of summer, but only rarely at other times. (Auth.)

B-55539

Worland, M.R., Block, W., Oldale, H., **Ice nucleation activity in biological materials with examples from antarctic plants,** *Cryo-letters,* Jan.-Feb. 1996, 17(1), p.31-38, 21 refs.

The freezing droplet method for determination of ice nucleator activity (INA) was assessed using samples of cold-adapted plant material (19 species) from South Georgia and the maritime Antarctic. The objectives were to quantify the effect of variables such as particle size, cooling rate and sample preparation on INA in order to standardize experimental protocols and data analysis. Three sizes of particles and 4 cooling rates were used for a foliose lichen *(Usnea aurantiaco-atra),* whilst fresh v. air-dried material were compared for a moss *(Bryum algens).* Smaller particles showed significantly higher INA than larger particles and the 4 cooling rates gave significantly different INA for the lichen, whereas sample drying significantly depressed INA in the moss. Representative INA spectra allowed comparison of the 19 species of lichens, mosses and flowering plants. First nucleation temperatures varied from -4.1°C to -5.4°C. At -7°C the mean numbers of nuclei per gram ranked as lichens>mosses>flowering plants and ranged from 257,000 to 16,220 nuclei per gram. It is crucial that procedures used in INA experiments be standardized to enable valid comparison between datasets and different studies to be made. (Auth. mod.)

B-55542

Hindell, M.A., Lea, M.A., Hull, C.L., **Effects of flipper bands on adult survival rate and reproduction in the Royal Penguin, *Eudyptes schlegeli*,** *Ibis,* July 1996, 138(3), p.557-560, 12 refs.

Because flipper bands are widely used in penguin research, it is important to determine if their use compromises the birds and hence the outcome of the research. This study was designed to investigate the influence of carrying flipper bands on survival rates of adults at sea and on the reproductive performance in a medium-sized penguin, the Royal Penguin *Eudyptes schlegeli,* conducted at Bauer Bay, Macquarie I. (Auth. mod.)

B-55577

Błażewicz, M., Jażdżewski, K., **Cumacea (Crustacea, Malacostraca) of Admiralty Bay, King George Island: a preliminary note,** *Polish polar research,* 1995, 16(1-2), p.71-85, With Polish summary. Refs. p.83-84.

Cumacean crustaceans found in 188 qualitative and quantitative samples of zoobenthos collected in Admiralty Bay by Polish antarctic expeditions in the years 1977-1989 were studied. In over 3000 individuals of these crustaceans, 12 taxa were recognized. *Eudorella splendida* clearly dominated the material. Other common species were *Campylaspis maculata* and *Vaunthompsonia inermis.* The highest cumacean density amounted to 2618 ind/m^2. Clear differences were observed between cumacean faunas of small grain sediment (muddy Ezcurra Inlet) and of mixed, coarser sediments (central part of Admiralty Bay with sand, gravel and mud). The dominance of *E. splendida* was strongly marked in shallow Ezcurra Inlet whereas in the deeper central part of Admiralty Bay the cumacean fauna was much more diversified. (Auth.)

B-55578

Gumińska, B., Heinrich, Z., Olech, M., **Macromycetes of the South Shetland Islands (Antarctica),** *Polish polar research,* 1994, 15(3-4), p.103-109, With Polish summary. 21 refs.

This paper describes and illustrates the species of macromycetes collected on King George I. and Livingston I. during the Polish antarctic expeditions of 1986-88, 1989-90 and 1991-93. Brief notes on taxonomy and distribution of the species are added. (Auth. mod.)

B-55579

Olech, M., **Lichenological assessment of the Cape Lions Rump, King George Island, South Shetland Islands; a baseline for monitoring biological changes,** *Polish polar research,* 1994, 15(3-4), p.111-130, With Polish summary. 14 refs.

The present paper contains a list of 104 taxa of lichens and lichenicolous fungi found at Lions Rump, site of Special Scientific Interest No.34 (King George I.), together with their distribution and ecological analysis. A provisional vegetation map of the area is also provided. During the field survey the data were collected using the cartogram method in a grid of squares 250 x 250 m. The current abundance and spatial distribution of lichen species provide baseline data for long-term monitoring of biological changes. (Auth.)

B-55580

Rakusa-Suszczewski, S., **Crystalline cones from eyes of *Euphausia superba* Dana,** *Polish polar research,* 1994, 15(3-4), p.131-134, With Polish summary. 4 refs.

The length of crystalline cones (cc) is proportional to krill body length and this proportion can be described by the equation L cc = L krill x 1.679 + 52.032 (cc—μm; L krill—mm). By measuring cc one can determine the size of krill to a precision of 2-3 mm. The structure of crystalline cones is not crystal, and the elemental composition includes much S and Ca. Crystalline cones are often found in the stomach and feces of animals feeding on krill. (Auth.)

B-55581

Cruwys, E., Davis, P.B., **Moulting southern elephant seals, *Mirounga leonina* (L.) and local weather conditions, on Livingston Island, South Shetland Islands,** *Polish polar research,* 1994, 15(3-4), p.135-146, With Polish summary. 12 refs.

Molting southern elephant seals, *Mirounga leonina* (L.), were counted in 17 discrete wallows at Walker Bay on Livingston I. between Jan. 2 and Feb. 16, 1994. Daily weather conditions were also recorded. It was found that, although there were no overall correlations between wind scale, air temperature, sunshine, precipitation, sea roughness or cloud cover with seal numbers, there were conditions on specific days that affected the movements of seals between wallows. Most notably, it was found that numbers of seals decreased when they were exposed to winds, and that they often sought out more sheltered sites nearby. (Auth.)

B-55588

Izaguirre, I., Vinocur, A., Mataloni, G., **Summer changes in the vertical distribution of chlorophyll-*a* in Boeckella Lake (Hope Bay, Antarctic Peninsula),** *Antarctic record,* Mar. 1996, 40(1), p.43-52, With Japanese summary. 16 refs.

Vertical distribution of phytoplankton chlorophyll-*a* in Boeckella Lake was studied during summer periods in 1992 and 1993. Two opposite sites subjected to different organic matter inputs from the adjacent penguin rookeries were periodically sampled at three depths. Chlorophyll-*a* concentrations varied from less than 0.10 microg/l during the ice thawing period to 14.08 microg/l during late summer 1993. Recorded phosphate values compare to data reported for other enriched antarctic lakes (14.77-970.46 microg PO_4-P/l). Significant differences between both sampling sites were observed in relation to conductivity, pH, phosphate concentrations and chlorophyll-*a*, stressing the influence of the penguin rookeries on the limnological features of the lake. These differences were more pronounced during the ice cover period. (Auth.)

B-55592

Arnould, J.P.Y., Briggs, D.R., Croxall, J.P., Prince, P.A., Wood, A.G., **Foraging behaviour and energetics of wandering albatrosses brooding chicks,** *Antarctic science,* Sep. 1996, 8(3), p.229-236, Refs. p.235-236.

The energy expenditure of 10 (5 male, 5 female) wandering albatrosses *(Diomedea exulans* Linnaeus 1758) brooding chicks on Bird I. was measured using doubly-labelled water. At-sea foraging behavior was measured in the same individuals using satellite telemetry and leg-mounted activity recorders. Mean mass-specific daily energy expenditure was 341 kJ/kg/day during a mean of 4.12 days at sea and did not differ between the sexes. This is significantly lower than previously reported for the species and the lowest recorded for any albatross. There were no significant relationships between energy expenditure and the proportion of time spent flying (59.7%), distance flown (1448 km) or average speed (16.5 km/h), suggesting that flying is not the most energetically expensive activity during foraging trips. (Auth.)

B-55593

Boyd, I.L., Walker, T.R., Poncet, J., **Status of southern elephant seals at South Georgia,** *Antarctic science,* Sep. 1996, 8(3), p.237-244, 30 refs.

Approximately 54% of the world population of southern elephant seals *(Mirounga leonina)* breeds at South Georgia. A partial survey in 1951 and a complete survey in 1985, together with counts at specific sites between these dates, suggested that the population (around 100,000 breeding females) had not changed significantly in 34 years. This was in contrast to marked declines in most other populations. To examine this further, the authors conducted a third survey in 1995. This produced an estimate of 113,444 (s e=4902) breeding females. Taking into account improved information about the behavior of female elephant seals since the survey in 1985, there was no significant change in the number of breeding female elephant seals between 1985 and 1995. When combined with information from the 1951 survey, this supports the view that the total population size has not changed significantly during the past 45 years. Evidence for regulation of the population by environmental factors is equivocal. It is hypothesized that the lack of any net change in population size may be linked to a limited availability of high quality breeding habitat. (Auth.)

B-55594

Brouwer, P.E.M., ***In situ* photosynthesis and estimated annual production of the red macroalga *Myriogramme mangini* in relation to underwater irradiance at Signy Island (Antarctica),** *Antarctic science,* Sep. 1996, 8(3), p.245-252, Refs. p.251-252.

For the first time, photosynthesis of *Myriogramme mangini* (Gain) Skottsberg, one of the dominant red macroalgae in the sublittoral of Signy I., was studied *in situ* under natural irradiance levels in specially developed incubation chambers. *M. mangini* is adapted to low irradiance levels. Water transparency varied over the year. A maximum attenuation coefficient (k_d) of 0.328/m was reached in Jan., and the water was clearest in Sep. with a k_d value of 0.079/m. Classification of the water type on a Jerlov scale gave water type 4 in Jan. and II in May and June. The mean k_d value over the year was 0.158/m and the water was classified as Jerlov's water type 1. The euphotic depths (Z_{eu}) for 1%, 0.1% and 0.01% surface irradiance levels were 29.1 m, 43.7 m and 58.3 m respectively. Photosynthetic characteristics were determined, with the oxygen production rates and irradiance levels measured *in situ,* using P-I curves. (Auth. mod.)

B-55595

Inomata, O.N.K., Montone, R.C., Lara, W.H., Weber, R.R., Toledo, H.H.B., **Tissue distribution of organochlorine residues—PCBs and pesticides—in antarctic penguins,** *Antarctic science,* Sep. 1996, 8(3), p.253-255, 6 refs.

Antarctic penguins make excellent indicators of organic pollutants (PCBs, DDTs and HCHs), which reach the Antarctic either by atmospheric or maritime transport and are concentrated through the food chains. They are found mainly in lipids, both in adipose and other tissues of the organisms. Tissue samples of four gentoo and one Adélie penguin were collected during the summers of 1991, 1992 and 1993. PCBs and organochlorine pesticides (OCPs) were analzyed in the adipose tissue, uropygeal gland, blood, brain, muscle, bone and liver. Organochlorines (OCs) were detected in the majority of the samples. The levels found in extractable fat were higher than in other tissues and the concentrations ranged from 42.3-1159.7 ng/g (HCB), from not detected to 39.3 ng/g (HCHs), from 30.8-972.3 ng/g (DDTs) and from 43.2-1583.6 ng/g (PCBs). (Auth.)

B-55596

Tanimura, A., Hoshiai, T., Fukuchi, M., **Life cycle strategy of the ice-associated copepod, *Paralabidocera antarctica* (Calanoida, Copepoda), at Syowa Station, Antarctica,** *Antarctic science,* Sep. 1996, 8(3), p.257-266, Refs. p.265-266.

The vertical distribution, abundance, population structure and life cycle of the ice-associated copepod *Paralabidocera antarctica* was studied in the fast ice near Showa Station in 1970, 1975 and 1982. The results indicated that *P. antarctica* inhabited the ice-seawater interface throughout the year with a one year life cycle and was actually present in the sea ice for most of the year except the summer. *P. antarctica* overwintered as naupliar stages (NIV-NV) with slow development in sea ice during winter. *P. antarctica* population then developed rapidly and attained adulthood in the water just beneath the sea ice during spring-summer. *P. antarctica* depended entirely on ice algae for food throughout its whole life-span, suggesting that the ice-seawater interface provides favorable food conditions for *P. antarctica.* The slow development in naupliar stages in sea ice and short copepodite life span in the water suggest that *P. antarctica* may adapt its growth strategy to suit the varying fast ice/water interface environment. (Auth.)

B-55597

White, M.G., Veit, R.R., North, A.W., Robinson, K., **Egg-shell morphology of the antarctic fish, *Notothenia rossii* Richardson, and the distribution and abundance of pelagic eggs at South Georgia,** *Antarctic science,* Sep. 1996, 8(3), p.267-271, 27 refs.

During winter research cruises to South Georgia (1983 and 1993) fish eggs were abundant in the neuston. Examination of the external sculpturing and the micropyle morphology of the eggs collected during 1993 using scanning electron microscopy indicated that these were fertilized ova of *Notothenia rossii marmorata.* A comparison between the eggs of *N. rossii* from Kerguelen Is. and South Georgia showed these to have a similar surface morphology but a difference in the structure of the micropyle. In 1993, the abundance of fish eggs in the neuston varied from 0-116 eggs/m^3 with an average of 4.5 eggs/m^3. During 1983, eggs were most abundant in the neuston but at lower average levels (0.04 eggs/m^3, range 0-1.17 eggs/m^3) and these were distributed from the surface to >380 m. (Auth.)

B-55598

Zdzitowiecki, K., White, M.G., **Acanthocephalan infection of inshore fishes at the South Orkney Islands,** *Antarctic science,* Sep. 1996, 8(3), p.273-276, 15 refs.

An examination of notothenioid fish of 3 species, including 23 immature *Notothenia coriiceps* Richardson, revealed seven acanthocephalan species, including 2 Echinorhynchida occurring in the intestine and 5 Polymorphida in the body cavity. Four species, *Metacanthocephalus johnstoni* Zdzitowiecki, *Corynosoma arctocephali* Zdzitowiecki, *C. pseudohamanni* Zdizitowiecki, and *C. shackletoni* Zdzitowiecki are reported for the first time from the area. Polymorphida were twice as numerous as Echinorhynchida. The dominant parasites were *Aspersentis megarhynchus* (Linstow) and *C. hamanni* (Linstow) in *N. coriiceps,* and *C. bullosum* (Linstow) in *Chaenocephalus aceratus* (Lönnberg). The infection of *N. coriiceps* and *C. aceratus* in this area was compared with these species and *N. rossii* Richardson in neighboring areas. The infection of *N. coriiceps* at the South Orkney Is. is more similar to that at the South Shetland Is. than that found at South Georgia. (Auth.)

B-55612

De Pina, G.M.A., **New species of *Oradarea* and notes on some other eusirids from Antarctica (Crustacea, Amphipoda),** *Cahiers de biologie marine,* 1995, 36(4), p.251-258, With French summary. 15 refs.

A new species of antarctic Eusiridae, *Oradarea crenelata* sp. nov., is described and illustrated. New data on morphology are reported for the eusirids *Liouvillea oculata, Eurymera monticulosa* and *Bovallia gigantea,* also recorded in the antarctic region. (Auth.)

B-55614

Block, W., Starý, J., **Oribatid mites (Acari: Oribatida) of the maritime Antarctic and Antarctic Peninsula,** *Journal of natural history,* June 1996, 30(7), p.1059-1067, 26 refs.

Eleven species of oribatid mites are reported from 26 maritime antarctic islands. The oribatid faunas of Fredriksen, Atriceps (South Orkney Is.), Cockburn, Seymour, Vega, Brabant, Adelaide, Lagoon, Léonie, Horseshoe, Alexander Islands and Peter I Øy were studied for the first time. *Austroppia crozetensis* (Richters, 1908) and *Magellozetes processus* Hammer, 1962 are first records for the antarctic region. *Halozetes belgicae longiseta* Wallwork, 1967 is a new record for the South Orkney Is., *Edwardzetes dentifer* Hammer, 1962, is new for the South Shetland Is., *M. processus* Hammer, 1962 is new for Graham Land whilst *Globoppia loxolineata longipilosa* Covarrubias, 1968 and *Magellozetes antarcticus* (Michael, 1895) are new records for Palmer Land. The distribution patterns of the 11 species of oribatid mites are figured and their zoogeographical relationships are discussed. (Auth.)

B-55615

Schatt, P., Féral, J.P., **Completely direct development of *Abatus cordatus*, a brooding schizasterid (Echinodermata: Echinoidea) from Kerguelen, with description of perigastrulation, a hypothetical new mode of gastrulation,** *Biological bulletin,* Feb. 1996, 190(1), p.24-44, 82 refs.

Development of the brooding schizasterid *Abatus cordatus,* a subantarctic echinoid endemic to Kerguelen, is described. Females spawn non-buoyant eggs 1300 microns in diameter, which are fertilized by elongated sperm (head 1 micron wide and 15 microns long). The main characteristics of this development are (1) incomplete cleavage beginning at the animal pole that becomes holoblastic, giving a filled wrinkled blastula 26 days after fertilization; (2) apparent external migration of mesenchyme cells in the perivitelline space, from the animal to the vegetal pole during gastrulation while the archenteron invaginates; (3) hatching occurring at the end of the gastrulation (65 days after fertilization); (4) differentiation of the vestibule from a thickening of the oral epidermis as soon as the end of gastrulation is attained; and (5) production of a juvenile directly from the gastrula without any larval stage. The juvenile that leaves the brood chamber is 2 mm in diameter and about 250 days old. *A. cordatus* is thus a true completely direct developer. (Auth.)

B-55623

Berruti, A., Cooper, J., Newton, I.P., **Morphometrics and breeding biology of the whitechinned petrel *Procellaria aequinoctialis* at subantarctic Marion Island,** *Ostrich,* Sep. 1995, 66(2&3), p.74-80, 38 refs.

Aspects of adult morphometrics and the breeding biology of the summer-breeding Whitechinned petrel at sub-antarctic Marion I. are given, based on a study conducted in 1980-81, along with additional observations on breeding success made in 1990-91. It is concluded that Whitechinned petrels at Marion I. are similarly sized and breed in a similar manner to other studied populations of the nominate race. The eradication of cats at Marion I. in 1991 should now lead to a slow population recovery. (Auth.)

B-55624

Viswanathan, G.M., Afanas'ev, V., Buldyrev, S.V., Murphy, E.J., Prince, P.A., Stanley, H.E., **Lévy flight search patterns of wandering albatrosses,** *Nature,* May 30, 1996, 381(6581), p.413-415, 31 refs.

Lévy flights are a special class of random walks whose step lengths are not constant but rather are chosen from a probability distribution with a power-law tail. Realizations of Lévy flights in physical phenomena are very diverse, examples including fluid dynamics, dynamical systems, and micelles. Such diversity raises the possibility that Lévy flights may be found in biological systems. A decade ago, it was proposed that Lévy flights might be observed in the behavior of foraging ants. Recently, it was argued that *Drosophila* might perform Lévy flights, but the hypothesis that foraging animals in natural environments perform Lévy flights has not been tested. Here the authors study the foraging behavior of the wandering albatross *Diomedea exulans,* which shows a power-law distribution of flight-time intervals. Their finding of temporal scale invariance is interpreted in terms of a scale-invariant spatial distribution of food on the ocean surface. Finally, the significance of the finding is examined in relation to the basis of scale-invariant phenomena observed in biological systems. (Auth. mod.)

B-55634

White, G.J., **Microbial ecosystems in Antarctica: is protection necessary?,** *Antarctic journal of the United States,* 1995, 30(1-4), p.13-15, 39 refs.

In the McMurdo Dry Valleys and other continental locations in Antarctica, ecological systems are composed entirely of microbial life forms. Increased human presence over recent years in these areas has raised concern that their unique microbial systems may be at risk and that human interference with microbial ecosystems may, in turn, affect scientific research. The purpose of this paper is to provide a brief overview of the information available on microbial ecosystems in continental Antarctica and to discuss the potential need for implementing policies for preserving these systems. The focus of the discussion is on microbial systems inhabiting soil and rock surfaces in terrestrial areas away from marine influence.

B-55649

Greenfield, L.G., **Water soluble substances in terrestrial antarctic plants and microbes,** *New Zealand natural sciences,* 1989, Vol.16, p.21-30, 21 refs.

Many antarctic plants and microbes contain large amounts of water-soluble substances. These decompose and release mineral nitrogen at differing rates (algae, including cyanobacteria>lichens>mosses). More mineral nitrogen is produced at high than low moisture levels during incubations at 4°C. Results are discussed in relation to soil colonization and the environmental conditions prevailing in two climatically different areas of Antarctica: maritime and continental regions. (Auth.)

B-55651

Loppes, R., Devos, N., Willem, S., Barthélemy, P., Matagne, R.F., **Effect of temperature on two enzymes from a psychrophilic *Chloromonas* (Chlorophyta),** *Journal of phycology,* Apr. 1996, 32(2), p.276-278, 11 refs.

A psychrophilic green alga belonging to the *Chloromonas* genus and here named ANT1 was collected in Antarctica. The activities of two enzymes, nitrate reductase and argininosuccinate lyase, were measured at various temperatures and compared to the corresponding enzyme activities in the mesophilic species *Chlamydomonas reinhardtii* Dangeard. For both enzymes, the temperature for apparent optimal activity was some 20°C lower in ANT1 than in *C. reinhardtii.* The enzymes were also subjected to various heat treatments before measuring their activities. Both psychrophilic enzymes were more sensitive to heat than the corresponding mesophilic enzymes. It is worth stressing, however, that in both species nitrate reductase was much more sensitive to heat than argininosuccinate lyase, which probably indicates that the peculiar structure of each protein primarily determines its dependence on temperature. Secondary adaptations to low temperatures should then occur to confer the psychrophilic character. (Auth.)

B-55658

Gutt, J., Starmans, A., Dieckmann, G., **Impact of iceberg scouring on polar benthic habitats,** *Marine ecology progress series,* June 27, 1996, 137(1-3), p.311-316, 12 refs.

In situ photographs and videos demonstrate that iceberg grounding in both polar regions causes considerable damage to benthic communities. Sessile organisms are eradicated and pioneer species begin to grow in high abundances on the devastated substratum. A preliminary quantitative analysis shows that the sea floor in the Antarctic and Arctic areas of investigation is disturbed by icebergs statistically once every 230 and 53 yr, respectively. Due to the extreme slow growth of many species, particularly in Antarctica, areas frequently disturbed in this manner are likely to be characterized by a continuous natural fluctuation between destruction and recovery. Increased perturbation by iceberg groundings through predicted global warming will result in considerable impairment of this environment. (Auth.)

B-55688

Möller, C., Bühler, T., Dreyfuss, M.M., **Intraspecific genetic diversity of *Chaunopycnis alba* detected by random amplified polymorphic DNA assay,** *Mycological research,* June 1995, 99(6), p.681-688, 28 refs.

Some isolates of the cosmopolitan fungus *Chaunopycnis alba* are producers of Cyclosporin A, a potent immunosuppressive compound. In order to determine the taxonomic and geographic relationships of cyclosporin producers, the genetic variation among 90 isolates from 26 geographical locations was analyzed. As an outgroup, closely related taxa as well as a distant relative were included in this study. 297 different DNA fragments of 0.5 to 2.7 kb were obtained using eight 10-mer and one 22-mer primers of arbitrary nucleotide sequences. Computer analysis of these data showed a high genetic diversity within *C. alba*. The Jaccard coefficients indicated that 87% of all amplified DNA fragments were different among all the *C. alba* isolates examined. The differences between isolates of *C. alba* and those from other taxa were in the same range. Similarity values higher than 40% were obtained only for *C. alba* isolates derived from samples of the same geographic location and for several strains from various geographic provenances that were all Cyclosporin A producers. (Auth. mod.)

B-55725

Yang, H.F., Zhu, J.F., Wu, Y.L., **Analysis of DDT, DDE and PCBs in the blood of *Pygoscelis* of Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.133-135, In Chinese with English summary. 12 refs.

DLC G845.5.C45 1989 Orien China

The blood of Gentoo penguins and chinstrap penguins was analyzed by gas chromatography for organochlorine pesticides (DDT, DDE) and polychlorinated biphenyls (PCBs) during the first Chinese antarctic expedition. The results show that the concentrations of P, P^1-DDT, P, P^1-DDE and PCBs are 13.45 ng/g, 0.618 ng/g and 0.047 ng/g, respectively, in the blood of Gentoo penguins and the concentrations of P, P^1-DDT and P P^1-DDE are, respectively, 1.95 ng/g and 0.195 ng/g in the blood of chinstrap penguins. Levels of PCBs are related to the distance from the polluted sources. (Auth. mod.)

B-55726

Wang, R., Chen, S.H., **Distribution and abundance of larvae of antarctic krill (*Euphausia superba*) in the waters north and west of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.136-142, In Chinese with English summary. 14 refs.

DLC G845.5.C45 1989 Orien China

During the first Chinese antarctic expedition, zooplankton samples were collected in waters around the South Shetland Is. (S.S.Is.) and in the Bransfield Strait. Eggs and larvae of *Euphausia superba* Dana were identified and counted. There are 9 records of eggs from 27 stations. Most catches consisted of small numbers and were restricted to the near-shore area south of S.S.Is. The largest number (1500/1000 m^3) was found in the outer side of Smith I. No nauplius was found; the earliest stage found was metanauplius, which only occurred in two of three deep tows. The distribution of calyptopis I-III and furcilia I-II was similar: they were found in near-shore waters along the south coast of S.S.Is.; the slope north of Smith I.; and in the Gerlache Strait. In a station close to the northern entrance of the Gerlache Strait all the developmental stages, from calyptopis I to furcilia IV, were found. (Auth. mod.)

B-55727

Wang, R., Chen, S.H., Zhong, Z.R., **Population structure of antarctic krill (*Euphausia superba* Dana) in the waters north and west of Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.143-150, In Chinese with English summary. 17 refs.

DLC G845.5.C45 1989 Orien China

Krill length-frequency (L-F) distribution and sexual maturity stages were studied in waters around the South Shetland Is. and in the Bransfield Strait from Jan. 20 to Feb. 12, 1985. The common bimodal structure in L-F distribution was not found. Juveniles one or two years old were quite scarce; they were not found in populations north of South Shetland Is., and only 10-15% in the Bransfield Strait. The populations studied can be clustered into 3 groups occurring in different hydrographic areas. Group A, occurring in the slope waters of S.S. Is. and in the Bellingshausen Sea, has the largest average body length (47.0 mm), the highest percentage of adults (94.5%) and the highest percentage of gravid and spent individuals (35.8%) in females. Populations of group B occur principally in the shelf water around S.S.Is. and consist of 62.3% adults, 27.6% subadults and 10.1% juveniles. The percentage of gravid and spent females is 30.5%. Group C occurs in the southern part of the Bransfield Strait. (Auth. mod.)

B-55728

Zhang, J.B., Liu, H.B., **Hydromedusae and Siphonophora from the water area northwest of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.151-156, In Chinese with English summary. 14 refs.

DLC G845.5.C45 1989 Orien China

Samples of Hydromedusae and Siphonophora were collected in two areas of the southern ocean west of the Antarctic Peninsula during Jan. and Feb. 1985. A total of 6 species of Hydromedusae and 6 species of Siphonophora were identified: *Ressellia mirabilis, Arctapodema ampla, A. antarctica, Pyrostephos vanhoeffeni, Diphyes antarctica,* and *Muggiaea bargmannae*. The principal morphological characteristics of the above species are described and illustrated. Data on their geographic distribution in waters of the world ocean are given. (Auth. mod.)

B-55729

Tang, Z.C., Huang, L.Q., Yin, X.F., Chen, G.T., **Vertical distribution and bioturbation of macrobenthic animals in sediments of two bays of King George Island, Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.157-166, In Chinese with English summary. 11 refs.

DLC G845.5.C45 1989 Orien China

Based on the boxcores and X-radiographs of sediments obtained at three muddy stations of Maxwell and Admiralty bays in 1984-85, this article analyzes vertical distribution and bioturbation of macrobenthic animals in shallow waters. The results show that more than 90% of the total number of species and individuals per core occur in the upper 10 cm-layer of sediment, then decrease drastically in number from 10 cm downward. There were only one animal species and 1 or 2 individuals within the deeper sediments of 30-40 cm. X-radiographs also reveal abundant worm-burrows within the surface sediments. (Auth. mod.)

B-55730

Chen, S.H., Zhao, G.F., Zhu, X.Y., **Relationship between environmental conditions and aggregated distribution of antarctic krill (*Euphausia superba*),** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.167-173, In Chinese with English summary. 20 refs.

DLC G845.5.C45 1989 Orien China

Analyzing the correlations between catches of antarctic krill *Euphausia superba* and its living environments, the authors note that water temperature is a very important factor: krill with longer body length and in higher maturation stages live in warm sea water; krill with shorter body length and in low maturation stages live in a colder environment. The highest density of krill occurred in regions of the strongest thermocline. The greatest differences in the structure of the water masses appeared there. The highest numbers of krill were found on the continental-shelf slope of the Bransfield Strait and adjacent waters, and in deep waters of the Bellingshausen Sea. (Auth. mod.)

B-55731

Jiang, J.L., Xu, Z.M., **Relationship between phytoplankton, chlorophyll-*a* and krill (*Euphausia superba*) distribution in**

the north-western waters of the Antarctic Peninsula, Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.174-179, In Chinese with English summary. 6 refs.

DLC G845.5.C45 1989 Orien China

The data used in this study were collected from waters around the South Shetland Is. and in the Bransfield Strait during the first Chinese antarctic expedition in 1984-85. The samples came from 27 oceanographic stations. The results show that chlorophyll-*a* highest values (6.26 mg/m^3) occurred in the 10 m-layer of the northern sector of the Grauk Strait. The distribution of highest phytoplankton density (36.22 x 10^6 cells/m^3) was in the same area, but no krill was found in this region. In the western sector of the Antarctic Peninsula, krill was recorded on the TCL-204 Video Sounder; higher abundance of krill (>10^3 individuals/km^3) was found with the IKMT net, but a low density of phytoplankton (0.4 x 10^4 cells/m^3) was observed. The high values of chlorophyll-*a* and krill occurred in the 10-50 m layer, and the authors infer that there is a close relationship between chlorophyll-*a* and the vertical distribution of krill. (Auth. mod.)

B-55732

Xu, Z.M., Jiang, J.L., **Relations between the community of phytoplankton and water masses in the waters northwest of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.180-189, In Chinese with English summary. 4 refs.

DLC G845.5.C45 1989 Orien China

Phytoplankton samples collected northwest of the Antarctic Peninsula during the first Chinese antarctic expedition, Jan. 1985 were analyzed. Results show a close relationship between phytoplankton communities and types of water masses. *Corethron criophilum* was the dominant species in eastern Bransfield Strait; in its northern sector, the dominant species was the *Rhizosolenia*. *Biddulphia striata* was dominant in the southern sector of the Strait, while *Fragilaria antarctica* and *F. curta* were dominant in waters off the South Shetlands. (Auth. mod.)

B-55733

Ren, X.Q., Huang, L.Q., **Short report of the Cirripedia (Crustacea) in the waters northwest of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.190-196, In Chinese with English summary. 13 refs.

DLC G845.5.C45 1989 Orien China

Based on samples collected in the Bransfield Strait during the first Chinese antarctic expedition in 1985, a study of Cirripedia (Crustacea) is reported. Four species belonging to the family Scalpellidae, 4 subfamilies and 4 genera are identified. They are *Australscalpellum schizmatoplacinum* Newman & Ross, *Ornatoscalpellum vanhoeffeni* (Gruvel), *Anguloscalpellum angulare* (Nilsson-Cantell) and *Litoscalpellum discovery* (Gruvel). (Auth. mod.)

B-55734

He, D.H., Yang, G.M., Wang, C.S., **Copepoda from the water area northwest of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.197-219, In Chinese with English summary. 16 refs.

DLC G845.5.C45 1989 Orien China

Copepod samples were collected in the Bransfield Strait and in waters around the South Shetland Is., and near the Antarctic Circle, during the first Chinese antarctic expedition, Jan.-Feb. 1985. Twenty-four species belonging to 22 genera of 14 families and 3 orders were identified. Characteristics of 17 species are described and illustrated, and their geographic distribution and habitats are discussed.

B-55735

Ye, D.Z., Joiris, C.R., Overloop, W., **Bacterial number and biomass in the antarctic waters,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.220-227, In Chinese with English summary. 14 refs.

DLC G845.5.C45 1989 Orien China

Two hundred and thirty-nine water samples, taken on board the R/V *Marion Dufresne* between Jan. 11 and Feb. 8, 1987, were analyzed for bacterial number and biomass. These ranged from 0.52x10^7-70.50x10^7/l, and 0.06-7.62μg C/l. The values for vertical distribution decreased with increased water density; maximum values at most stations occurred in the layers above 50 m. In the light of the distribution patterns of bacterial number and biomass in the mixed surface layer of the ocean, the investigated area is divided into 3 zones: southern, middle and northern. In the southern zone, the values were 2x10^8/l and more than 4.0μg C/l, 0.5x10^8-1.0x10^8/l and 1.4-2.7μg C/l in the middle zone, and 5.6x10^8/l and 7.62μg C/l in the northern zone. The cell size in the latter was smaller than that in the other two zones.

B-55736

Wu, Y.L., He, D.H., **Studies on ultrastructure of the antarctic life. III. Studies of SEM on the ciliary sense organs of the antarctic Chaetognatha,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.228-234, In Chinese with English summary. 10 refs.

DLC G845.5.C45 1989 Orien China

Studies of the fine structure of ciliary sense organs are reported for 4 species of Chaetognatha: adults of *Sagitta gazellae, S. marri, Eukrohnia hamata* and the larva of *E. bathypelagica* from waters off West Antarctica. The ciliary sense organs are identified as L and T types. The former, which is distributed in the central part of the dorsal and ventral, is arranged longitudinally along the body axis of the organism. The latter, which is distributed on both sides of the dorsal and ventral, runs transversely to the body axis. The external fine structures of L and T types are similar: they consist of round-angled forms protruding from the body surface. The morphology, numbers and distribution of the ciliary sense organs, and differences among the species, are discussed.

B-55737

He, D.H., **Preliminary research of the Chaetognatha in the sea area northwest of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.235-239, In Chinese with English summary. 13 refs.

DLC G845.5.C45 1989 Orien China

A total of 1438 Chaetognatha specimens were collected in waters around the South Shetland Is., in the Bransfield Strait and near the Antarctic Circle west of the Antarctic Peninsula, during the first Chinese antarctic expedition in Jan. and Feb. 1985. Four species, *Eukrohnia hamata, E. bathypelagica, Sagitta marri* and *S. gazella,* belonging to 2 genera, were identified. The keys to genus and species, as well as the specimens' abundance, distribution and ecological characteristics, are presented.

B-55738

Wang, Z.P., Lin, B.K., Cao, Y.H., **Study of adaptability of Calanoida copepod to temperature and salinity: *Drepanopus bispinosus* in Burton Lake, Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.240-246, In Chinese with English summary. 12 refs.

DLC G845.5.C45 1989 Orien China

The tolerance to temperature and salinity of Burton Lake, Vestfold Hills, by *Drepanopus bispinosus* (Copepoda, Calanoida) was studied during different seasons. Results show that the copepod has marked physiological properties conducive to tolerance of low temperature and high salinity, especially after the winter season. These physiological features are attributed to natural acclimatization. The experimental data was processed by computer. The correlations of the animals' survival rate with the change of temperature and salinity are discussed and shown in tables and graphs.

B-55739

Wang, Z.P., **Effect of salinity on oxygen metabolism of copepod *Drepanopus bispinosus* in Burton Lake in the littoral of Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.247-252, In Chinese with English summary. 12 refs.

DLC G845.5.C45 1989 Orien China

Oxygen consumption values of the copepod *Drepanopus bispinosus* from Burton Lake were determined under different salinity conditions. Results show that salinity has a significant effect on animal oxygen metabolism: the oxygen consumption increased markedly in diluted sea water. Respiration rates under normal salinity and reduced salinity are discussed. The percentage of increased respiration rate under higher salinity conditions was 28.5%, which was less than that in lower salinity (53%). It is suggested that the features of the copepod's oxygen consumption correspond to their physiological characteristics, attributed to the copepod's higher tolerance of high salinity than low salinity conditions.

B-55740

Wang, X.Y., Zhu, B.Y., **Analysis of biochemical composition and inorganic elements in antarctic krill (*Euphausia superba* Dana),** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.253-259, In Chinese with English summary. 13 refs.

DLC G845.5.C45 1989 Orien China

The biochemical composition and inorganic elements of *Euphausia superba,* sampled at 3 stations in the Bransfield Strait and north of King George I. in Jan. 1985, are discussed. Tabulated results show the following: crude proteins are the major constituent in the krill body, ranging from 61 to 70% (dry weight); crude lipids range from 5.8 to 16.8%; ash ranges from 14.5 to 18.7%; and carbohydrates range from 1.5 to 2.0%. All of them account for 95.1% of krill dry weight. A negative correlation is found between crude protein and crude lipid contents in male krill from analysis of different sexual maturity data, suggesting a metabolic conversion of the protein and lipid contents with advancing sexual maturity. Analysis of amino acid composition in krill shows 17 different kinds. Analysis of inorganic elements indicates high concentrations of calcium, sodium, potassium, magnesium and strontium, which are the common elements in sea water. The calcium content alone is 48-56% of the total amount of inorganic elements in krill.

B-55741

Zhang, J.Z., et al, **Ecological distribution and genus composition of heterotrophic bacteria, yeasts and filamentous fungi in the ocean area of northwest Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.260-268, In Chinese with English summary. 19 refs.

DLC G845.5.C45 1989 Orien China

In 1984-1985, the first Chinese antarctic expedition investigated the occurrence and variety of marine microorganisms in waters northwest of the Antarctic Peninsula. Results are as follows: in the surface layer, heterotrophic bacterial populations ranged from $0.2x10^2$ to 10^4/l; the yeast populations ranged from $0.3x10^0$ to $7.9x10^1$/l; and the filamentous fungi density was less than $5.3x10^0$/l. Different depths showed little effects on the distribution of microorganisms in the water column. In pelagic surface sediments, abundant heterotrophic bacteria were found at the mud-water interface. Inside the cores 10-25 cm deep, very few living bacteria could be isolated. Yeasts and fungi were rarely found in the sediments. A total of 17 genera of bacteria, 6 genera of yeasts and 4 of filamentous fungi were identified in the water. More than 95% of the bacteria strains were Gram negative. The density of microorganisms was much higher in areas with human activity, where the dominance of the genus Acinetobacter was noted, indicating water pollution.

B-55742

Guo, N.L., Fu, X.J., **School searching and echo sounder image analysis of krill (*Euphausia superba*),** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.269-277, In Chinese with English summary. 6 refs.

DLC G845.5.C45 1989 Orien China

Continuous cruising searches for krill swarms, carried out using a TCL-204 echo sounder during the first Chinese antarctic expedition, Jan.-Feb. 1985 in waters west of the Antarctic Peninsula, are reported. Image records show 70 m as the maximum thickness of krill schools. Some schools have a horizontal extension of 7000 m with a vertical extension of only 10 to 20 m. Image analysis shows the following: the total area of vertical cross section of krill schools detected covers $3.3x10^6m^2$; the image area of the 10-20 m deep zone represents 29% of the total area; that of 0-10 m covers 21.6% of the total; the 0-40 m layer accounts for 77.90% of the total area, indicating that most krill schools occur in the 0-50 m layer. No regularity of day-night variation of image area was found. Regional and vertical distributions of the image, showing roughly the vertical movement of krill within the 100 m depth, are discussed.

B-55744

Zheng, L.F., Wu, Z.N., **Relationship between the distribution of formanifera and environmental factors in the northwestern sea area of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.285-300, In Chinese with English summary. 16 refs.

DLC G845.5.C45 1989 Orien China

Some 40 genera and 140 species of benthic foraminifera were identified from 23 surface sediment samples collected from the continental shelf, slope and basin northwest of the Antarctic Peninsula. Four distinct faunal assemblages and 8 subassemblages are recognized on the basis of predominant or species characteristic, the percentage of calcareous or arenaceous specimens, and faunal diversity. It was found that the dominantly siliceous assemblage of the northwestern shelf area of the Peninsula is associated with the Bransfield Strait southern and central waters, with low temperature and high salinity, and that the predominant calcareous assemblage south of the South Shetland Is. is mainly associated with the Bransfield Strait northern water with high temperature and Antarctic Warm Deep Water. Bottom temperature and salinity appear to be prime factors in limiting faunal assemblage distribution. (Auth. mod.)

B-55745

Chen, W.B., **Radiolaria in surface sediments off the northwest Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.301-312, In Chinese with English summary. 7 refs.

DLC G845.5.C45 1989 Orien China

Sixty-two genera and 87 species of Radiolaria in surface sediments of 22 stations in waters northwest of the Antarctic Peninsula were identified. Among these, *Antarctissa denticulata, Spongotrochus glacialis, Lithelius nautiloides, Antarctissa strolkovi, Rhizoplegma boreale* and *Ceratocyrtis histricosa* are the most abundant, making up 51-89% of the total population. Results of quantitative analysis show that the Radiolaria abundance is related to the water depth, the size of sediment and the proximity to open ocean. According to the variation in abundance of the dominant species, the fauna is divided into 3 assemblages: *A. denticulata* assemblage, *S. glaciali-L. nautiloides* assemblage and *R. boreale-A. denticulata-S. glacialis* assemblage. The distribution patterns of these assemblages correspond well to those of Bellingshausen water, Weddell water and Bransfield Strait central water, respectively. (Auth.)

B-55761

Chen, S.H., **Visual observations of the antarctic sea birds during the austral summer of 1984/85,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.438-444, In Chinese with English summary. 8 refs.

DLC G845.5.C45 1989 Orien China

Twenty-four species of antarctic sea birds, including 2 subspecies, were observed on board the research vessel *Xiangyanghong 10* during the first Chinese antarctic expedition in the summer of 1984-1985. The albatrosses *Diomedea exulans* and *D. melanophrys* were traced from the subantarctic to south of the Antarctic Circle. Wilson's storm petrels *Oceanites oceanicus*, including a few species of *Fregetta tropica*, and the cape pigeon *Daptin capense* had the highest occurrence rate. The silver-gray fulmars *Fulmarus glacialoides* always appeared together with a flock of cape pigeons. Among the swimming birds, the chinstrap penguins *Pygoscelis antarctica* had the largest distribution on the sea surface; their feeding radius was approximately 60 nautical miles. The radius of Adélie penguins *Pygoscelis adeliae* was 40 miles. Gentoo penguins *Pygoscelis papua* were observed only in Maxwell Bay, where the vessel was anchored. The occurrence and abundance of the sea birds coincided with those of krill, indicating a close relationship between the two. (Auth. mod.)

B-55771

Foissner, W., **Faunistics, taxonomy and ecology of moss and soil ciliates (Protozoa, Ciliophora) from Antarctica, with description of new species, including *Pleuroplitoides smithi* gen.n., sp.n.,** *Acta protozoologica,* May 1996, 35(2), p.95-123, Refs. p.122-123.

Fifty-nine moss and soil samples from the maritime and continental Antarctic were investigated for their ciliate fauna using the non-flooded Petri dish method. Collections were made from a variety of biotopes covering most principal soil and vegetation types of the region following a cline from 60°-78°S, i.e. of increasing climatic severity. Sixty-four species were found: 51 in region A (Signy I. and Livingston I.), 16 in region B (Antarctic Peninsula), and 14 in region C (continental Antarctic, viz. Ross I. and South Victoria Land). Twenty-nine out of the 64 species were first records for the region, and 5 of them were new species. Mean species number per sample was markedly higher in region A (9.6) than in region B (1.0) or region C (0.9), reflecting a dramatic faunal pauperization with increasing climatic severity and decreasing soil fertility. As compared with temperate and tropical regions, the antarctic ciliate species richness is decreased by at least one order of magnitude. (Auth. mod.)

B-55772

Rodhouse, P.G., Piatkowski, U., **Fine-scale distribution of juvenile cephalopods in the Scotia Sea and adaptive allometry of the brachial crown,** *Marine biology,* 1995, 124(1), p.111-117, 23 refs.

The pelagic nekton community was sampled with an RMT 25 opening/closing net and a neuston net at two stations in the Scotia Sea south of the Antarctic Polar Front in the open ocean (Station 1) and on the South Georgia northwestern slope (Station 2). A total of 119 cephalopods representing 9 species were removed from the samples, and mantle and arm lengths were measured to the nearest 0.1 mm. The most abundant species at each station was an undescribed *Brachioteuthis* sp. *Galiteuthis glacialis* and *Alluroteuthis antarcticus* were caught at both stations. *Histioteuthis eltaninae, Bathyteuthis abyssicola* and *Psychroteuthis glacialis* were caught at Station 1. *Mastigoteuthis psychrophila* and a *Chiroteuthis* sp. were caught at Station 2. There was evidence for ontogenetic descent in *G. glacialis.* This species was absent from the Antarctic Surface Water (ASW) at Station 1, where it was concentrated in the Circumpolar Deep Water (CDW). At Station 2 it was present throughout the water column to 1000 m. The other species were all caught in the core of the CDW (>400 m). In juvenile *B. ?picta, G. glacialis* and *A. antarcticus,* growth of the brachial crown is positively allometric with respect to mantle length. (Auth. mod.)

B-55773

Wilson, P., DeVries, A.L., **Hydrodynamic diameter of fish antifreeze molecules by quasi-elastic light scattering,** *Cryo-letters,* 1994, 15(2), p.127-130, 10 refs.

Measurements are reported of the hydrodynamic diameter of two classes of fish antifreeze molecule determined by quasi-elastic light scattering, as a function of temperature from 18°C to -2°C. The smallest antifreeze glycopeptide AFGP8 from the antarctic nototheniid *Dissostichus mawsoni* was found to decrease in size as the temperature was lowered. The Type 111 antifreeze peptide Abl from the antarctic zoarcid *Austrolycicthys brachycephalus* did not change diameter when cooled. (Auth.)

B-55774

DeMars, B.G., Boerner, R.E.J., **Mycorrhizal status of *Deschampsia antarctica* in the Palmer Station area, Antarctica,** *Mycologia,* July-Aug. 1995, 87(4), p.451-453, 14 refs.

Arbuscular mycorrhizae were absent in 75 individuals of *Deschampsia antarctica* (antarctic hairgrass) collected from the Palmer Station area and the accompanying soil sampled had no mycorrhizal infectivity. However, *D. antarctica* was capable of forming typical arbuscular mycorrhizae infections with *Glomus intraradices* and *Glomus etunicatum* in the greenhouse. (Auth.)

B-55776

Fedak, M.A., Arnbom, T., Boyd, I.L., **Relation between the size of southern elephant seal mothers, the growth of their pups, and the use of maternal energy, fat, and protein during lactation,** *Physiological zoology,* July/Aug. 1996, 69(4), p.887-911, Refs. p.909-911.

Pregnant southen elephant seals vary in size by more than a factor of three when they come ashore to give birth and nurse their pups. The authors measured the use of body materials and energy over the course of lactation using a combination of isotope dilution and mass change during four breeding seasons on South Georgia. On average, mothers lost 35% of their mass at parturition during lactation. The relative amount that mothers expend on their pups is highly variable and shows little consistent trend with the mother's mass. Some large mothers used approximately 30% of their stored energy to produce medium- or large-sized pups. While some smaller mothers produced only small pups, others used all of, or more than, the reserves estimated to be available without incurring deleterious effects. These small animals may be at risk of compromising their future reproduction. (Auth. mod.)

B-55777

McMinn, A., **Comparison of diatom preservation between oxic and anoxic basins in Ellis Fjord, Antarctica,** *Diatom research,* May 1995, 10(1), p.145-151, 19 refs.

Sedimentary diatom assemblages from adjacent sub-basins in Ellis Fjord reflect the differing degree of oxygenation in each of their bottom waters. The absence of a benthic fauna and a lower pH in the anoxic sub-basin allows the preservation of the smaller, more fragile diatoms. By contrast, the presence of an active benthos and a higher pH in the well-oxygenated sub-basin results in preservation of only the more robust species. Approximately 50% of diatom cells sedimenting from the surface waters of the oxygenated sub-basin of Ellis Fjord are removed prior to incorporation into the sediments. (Auth.)

B-55778

Convey, P., Block, W., **Antarctic Diptera: ecology, physiology and distribution,** *European journal of entomology,* Feb. 15, 1996, 93(1), p.1-13, Refs. p.11-13.

In contrast to northern polar areas, the dipteran fauna of Antarctica is depauperate, with only two naturally occurring species of Chironomidae. One, *Parochlus steinenii,* reaches the southern limit of a distribution covering the high Andes, Tierra del Fuego, South Georgia and the South Shetland Is. in the maritime Antarctic. The other, *Belgica antarctica,* is endemic to the maritime Antarctic. Distributional data and evidence from an accidental introduction of a third chironomid *(Eretmoptera murphyi)* suggest that difficulty of colonization is the major factor limiting the number of dipteran species present in the maritime Antarctic. Other subantarctic species are likely to be preadapted to more rigorous conditions, should natural or man-induced colonization opportunities occur. Evidence from physiological and ecological studies identify adaptations which allow these two species to survive in the harsh terrestrial environment of Antarctica. Life history characteristics of all three species include flexibility in development rates and size achieved, and the ability to continue activity at low positive temperatures. (Auth. mod.)

B-55788

Zdzitowiecki, K., Pisano, E., **New records of acanthocephalans infecting fish off Heard Island (Kerguelen sub-region, sub-antarctic),** *Archive of fishery and marine research,* 1996, 43(3), p.257-264, With German and French summaries. 14 refs.

Between Aug. and Oct. 1993, elasmobranchs and teleosts were collected from the open sea bottom waters of Heard I. in the Kerguelen sub-region of the sub-antarctic, and examined for acanthocephalans. A total of 38 fish were collected. Although elasmobranchs were not infected, 8 specimens of 4 teleost species were infected. Three acanthocephalan species were recovered. *Heterosentis heterachanthus* (Linstow) (adults), *Corynosoma arctocephali* Zdzitowiecki (cystacanths) and *Corynosoma bullosum* (Linstow) (cystacanths). The first two were new geographic recordings for the Kerguelen sub-region. It is surmised that additional species of acanthocephalans will be found in this area. (Auth. mod.)

B-55789

Zdzitowiecki, K., Pisano, E., **New records of Digenea infecting elasmobranch and teleost fish off Heard Island (Kerguelen sub-region, sub-antarctic),** *Archive of fishery and marine research,* 1996, 43(3), p.265-272, With German and French summaries. 20 refs.

Between Aug. and Oct. 1993, elasmobranchs and teleosts were collected from the shelf areas off Heard I. and examined for digeneans. A total of 38 fish were collected. Seven digenean species were recovered. Up to now, 7 or 8 species have been reported from the investigated area, much less than in other areas of the Kerguelen sub-region, as well as in the West Antarctic. Therefore, it is suggested that additional species of digeneans will be found in this area. (Auth. mod.)

B-55790

Hull, C.L., Wilson, J., **Location of colonies in Royal Penguins *Eudyptes schlegeli*: potential costs and consequences for breeding success,** *Emu,* June 1996, 96(pt.2), p.135-138, 16 refs.

At Macquarie I., Royal penguin *Eudyptes schlegeli* colonies are found at a variety of altitudes from sea level to sites approximately 200 m a.s.l. The added energetic burden of colonies located away from the beach is yet to be assessed. Taking into account the number of times that an individual penguin needs to return to its nest over a breeding season, the distance and altitude of a colony from the water could substantially increase the total energetic cost of breeding, and possibly affect the breeding success of individuals. The time taken for Royal penguins to travel to an inland colony was monitored. From the shortest and longest time taken by Royal penguins to reach the colony, the authors attempted to assess factors which might affect the variation in time taken. These data were used to calculate a hypothetical energetic cost to the penguins due to the location of this colony and to assess whether location might impact on breeding success. (Auth. mod.)

B-55793

Barnes, D.K.A., **Sublittoral epifaunal communities at Signy Island, Antarctica. I. The ice-foot zone,** *Marine biology,* Jan. 1995, 121(3), p.555-563, 70 refs.

Photographs were taken every 0.5 m along three transects of 5.5 m length on shallow rock faces at Signy I. during the austral summer of 1991-92. The percentage cover of substratum ranged from 0 to 100% and the colonizing communities included representatives of ten phyla. The zone from mean low-water neap level to 1.5 m depth was mostly devoid of organisms as a result of the seasonal formation of the encrusting ice foot. Coralline and macroalgae dominated from 2 to 3 m and animal groups from 3.5 to 5.5 m. Bryozoans, followed by sponges, were the most abundant animal phyla. Within the bryozoans a succession of colonization of different species was observed, the most abundant two of which occupied >80% of substratum in places. Substratum type seemed to be the main factor influencing community development in the shallow sublittoral at Signy I. (Auth. mod.)

B-55794

Barnes, D.K.A., **Sublittoral epifaunal communities at Signy Island, Antarctica. II. Below the ice-foot zone,** *Marine biology,* Jan. 1995, 121(3), p.565-572, 59 refs.

Photographic samples were taken every 5 m along two 40 m transects on mostly rock face at Signy I. during the austral winter of 1991. Dense and taxonomically rich communities of benthos occurred at most of the sublittoral study locations. These communities, however, varied significantly with substratum type, substratum profile and depth. Algae were generally the largest occupiers of space, but the area of substratum colonized by animal taxa increased whenever the profile approached vertical. At depths shallower than 15 m, disturbance effects, largely from ice, restricted community development to a high degree, but the frequency of disturbance at 25 m appeared to maintain high diversity by preventing domination of the assemblage by a few competitively superior taxa. Bryozoans and sponges were the most abundant animal phyla. Among the bryozoans, species with an encrusting growth form occurred at the shallowest depths followed by encrusting massive/foliaceous species and, at 40 m, the erect flexible forms. (Auth. mod.)

B-55795

Brierley, A.S., Watkins, J.L., **Acoustic targets at South Georgia and the South Orkney Islands during a season of krill scarcity,** *Marine ecology progress series,* July 25, 1996, 138(1-3), p.51-61, 62 refs.

Dual-frequency acoustic data gathered during surveys around the Willis Islands, South Georgia, and Coronation I., South Orkneys, both in the Atlantic sector of the southern ocean, are analyzed in an attempt to characterize the composition of pelagic faunal communities and to quantify the contributions of 3 broad faunal size spectra (antarctic krill, nektonic species larger than krill, and zooplankton smaller than krill) to overall pelagic biomass at the 2 locations in this atypical season. The results of this analysis are further discussed in light of observations of breeding success and stomach content of a number of habitual krill predator species. (Auth. mod.)

B-55802

Bayer, F.M., **Antarctic genus *Callozostron* and its relationship to *Primnoella* (Octocorallia: Gorgonacea: Primnoidae),** *Biological Society of Washington. Proceedings,* Apr. 16, 1996, 109(1), p.150-203, 41 refs.

Specimens of the gorgonacean genus *Callozostron* obtained in antarctic waters during operations conducted by the U.S. Antarctic Research Program reveal that *C. horridum* Kükenthal, 1909 is a junior synonym of *C. mirabile* Wright, 1885. *C. carlottae* Kükenthal, 1909 is confirmed as a valid species and two new species, *C. diplodiadema* and *C. acanthodes,* are described. All species are illustrated by stereoscopic scanning electron micrographs (SEM). The genus *Primnoella* Gray, 1858 is restricted to the "Compressae" species group, and polyps and sclerites of *P. australasiae* (Gray, 1850), type species of the genus, are illustrated by SEM for the first time. A new genus, *Convexella,* is established for the "Convexae" species group of *Primnoella,* and polyps of *P. magelhaenica* Studer, 1879, type species of *Convexella* from a wide bathymetric and geographic range, are illustrated by SEM to show morphological variation within the species. (Auth.)

B-55810

Fredericq, S., Ramírez, M.E., **Systematic studies of the antarctic species of the Phyllophoraceae (Gigartinales, Rhodophyta) based on *rbc*L sequence analysis,** *Hydrobiologia,* July 26, 1996, Vol.326-327, International Seaweed Symposium, 5th, Valdivia, Chile, Jan. 1995. Proceedings, p.137-143, 22 refs.

The taxonomic placement of four antarctic species of the marine red algal family Phyllophoraceae (Gigartinales) is assessed within a preliminary molecular phylogeny of the family based on direct sequences analysis of the chloroplast gene *rbc*L. Parsimony analysis of *rbc*L sequences indicates that *Gymnogongrus antarcticus* and *G. turquetii* cluster in a clade consisting predominantly of Southern Hemisphere species currently placed in *Gymnogongrus* and *Ahnfeltiopsis,* whereas *Phyllophora ahnfeltioides* and *P. antarctica* cluster in a separate clade that is widely divergent from the Northern Hemisphere *Phyllophora* clade. Results from molecular and morphological data challenge the current taxonomic concept that type of life history is a phylogenetically valid criterion for recognition of genera in the Phyllophoraceae. (Auth.)

B-55811

Cormaci, M., Furnari, G., Scammacca, B., Alongi, G., **Summer biomass of a population of *Iridaea cordata* (Gigartinaceae, Rhodophyta) from Antarctica,** *Hydrobiologia,* July 26, 1996, Vol.326-327, International Seaweed Symposium, 5th, Valdivia, Chile, Jan. 1995. Proceedings, p.267-272, 15 refs.

Results of a seasonal study on biomass in an infralittoral population of *Iridaea cordata* from Terra Nova Bay are reported. Thalli were collected during the IX Italian Antarctic Expedition (austral summer 1993-94). The population studied lives at depths of 4 to 6 m, where the highest density of plants occurred. The highest value of biomass was found at the beginning of summer. In that period 72.5% of biomass was from 128 specimens corresponding to 13.4% of the population in numbers. Small and medium specimens provided the remaining biomass of 5 and 22.5%, respectively. Data showed that biomass depended mainly on the presence of large heavy specimens, even though they were always few in number. Moreover, the occurrence of such large thalli at the beginning of summer suggests that *I. cordata* continues to grow during the antarctic winter. (Auth. mod.)

B-55818

Iken, K., **Trophic relations between macroalgae and herbivores in Potter Cove (King George Island, Antarctica)** [Trophische Beziehungen zwischen Makroalgen und Herbivoren in der Potter Cove (King-George-Insul, Antarktis)], *Berichte zur Polarforschung,* 1996, No.201, 206p., In German with English summary. Refs. p.166-188.

The significance of macroalgae for the benthic food web of an antarctic marine shallow water ecosystem was investigated. The main topics of this work were the qualitative and quantitative significance of macroalgae as food for important herbivores. Possible defense mechanisms of the macroalgae against animal feeding were also analyzed. The main results of this study can be summarized as follows. Benthic marine microalgae contribute significantly to the diet of herbivores in Potter Cove. Algae are not eaten by accident but on purpose by herbivores and thus macroalgae form an important component of the trophic web in this ecosystem. The resistance of algae against animal feeding is based mainly on structural features of the macroalgae such as the thallus toughness. Neither the nutritional value nor chemical compounds plays a significant role as antifeedants in antarctic macrophytes. In Potter Cove, benthic primary producers play an important role as a food resource for the fauna. The reason is probably the different availability of primary production as food. (Auth. mod.)

B-55844

Lara, R.J., Thomas, D.N., **Formation of recalcitrant organic matter: humification dynamics of algal derived dissolved organic carbon and its hydrophobic fractions,** *Marine chemistry,* Dec. 1995, 51(3), p.193-199, 19 refs.

The incorporation of radiolabeled carbon into XAD2-fractions of dissolved organic matter was followed during the growth, stationary and degradation phases of a batch culture of the antarctic diatom *Thalassiosira tumida.* Changes in the fractions over the 267 day experiment were correlated with the production and decomposition of particulate organic matter. The bulk of the acid and neutral hydrophobic XAD-fractions, traditionally considered to be humic, were produced mainly during the diatom growth phase: 70% of this carbon was present in a relatively stable form by the end of the first month, representing 5% of the maximum carbon biomass. There was a progressive accumulation of a hydrophobic DOC fraction tightly bound to the XAD resin. This fraction is normally not considered following XAD2 extraction of aquatic humic material. However, it is evidently an important component of a resistant DOC pool, increasing during the experiment to levels between 40 and 50% of total DOC after 7-8 months. (Auth.)

B-55870

Ackley, S.F., Sullivan, C.W., **Physical controls on the development and characteristics of antarctic sea ice biological communities—a review and synthesis,** Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 24p. + figs., Refs. p.16-23. For another version see 49-1792 or 23J-51832.

Ice structures found in antarctic sea ice and related morphological processes are summarized, including: frazil ice growth; the flooded snow layer; pressure ridge induced flooding; thermally driven brine drainage; and platelet-ice formation. The associated colonization, physiological adaptation and growth of sea ice biota within these structures, to the levels presently identifiable, also are reviewed. A strong interaction exists between the physical processes that form, evolve and deteriorate sea ice and the biological communities located within it. Variability of ice structure and associated biological communities over small spatial scales necessitated analysis of the biological component in combination with physical and chemical properties of the sea ice. The ice microstructure provides indications of the growth and evolution of the ice properties and initially defines how ice biota colonize the ice. The light, temperature, space and nutrient fields within which ice biota subsequently adapt and grow are the other key determinants of the biology. (Auth. mod.)

B-55875

Zhong, X.F., Wang, R., **Number and composition of oocytes in gravid females of antarctic krill, *Euphausia superba* Dana,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.16-22, In Chinese with English summary. 16 refs.

Based on the samples collected during 4 summer cruises in 1989-1990 and 1992-1993 in the Prydz Bay region, the number and developmental phase composition of ovarian oocytes in gravid krill females *Euphausia superba* Dana, and the relations of the number of oocytes with body weight and body length, were studied. The number of oocytes ranged from 2188 to 9263, averaging 5283. Year-to-year changes of the number of oocytes were not statistically significant. The relationship between the number of oocytes (OC) and body wet weight (WW, g) was OC=5172, 1 WW-1121.6, R=0.856; that between OC and eye diameter (ED, mm) was OC=3799, 1 ED-3175.6, R=0.431; and that between OC and uropod length (UL, mm) was OC=813.2 UL-35.98, R=0.243. Four developmental phases of oocytes were observed, but their composition percentages varied with different samples which were collected at different times. (Auth.)

B-55885

North, A.W., **Locomotory activity and behaviour of the antarctic teleost *Notothenia coriiceps*,** *Marine biology,* July 1996, 126(1), p.125-132, 45 refs.

The main aim of this preliminary study was to quantify the proportion of time devoted to locomotory activity in a free-living *Notothenia coriiceps* in antarctic waters, and to observe its natural behavior. (Auth. mod.)

B-55886

Wilson, R.P., Culik, B.M., Peters, G., Bannasch, R., **Diving behaviour of Gentoo penguins, *Pygoscelis papua*; factors keeping dive profiles in shape,** *Marine biology,* July 1996, 126(1), p.153-162, 32 refs.

This paper examines the diving behavior of Gentoo penguins, *Pygoscelis papua,* in antarctic waters and describes parameters relevant in determining the manner in which the dives are executed. The authors consider how various behaviors can maximize prey encounter rates under different hypothetical prey distributions. (Auth. mod.)

B-55895

Crittenden, P.D., **Effect of oxygen deprivation on inorganic nitrogen uptake in an antarctic macrolichen,** *Lichenologist,* 1996, 28(4), p.347-354, Refs. p.353-354.

Snow meltwater containing 36 ng/ml NO_3^--N (raised here to between 95-101 ng/ml NO_3^--N) and 112 ng/ml NH_4^+-N was sprayed onto illuminated *Usnea sphacelata* at 2°C in a 2-1 capacity transparent perspex chamber force-ventilated with either air or O_2- (and CO_2-) free N_2. The NO_3-concentration in meltwater recirculated through a layer of *U. sphacelata* fell to c. 8 ng/ml after 1.25 h. Although the pattern of decline was broadly comparable in both air and N_2, the initial rate of decline was lower in N_2. When undepleted meltwater was continuously sprayed onto the lichen and the effluent collected for analysis, the lichen was found to retain 55% of the wet deposited NO_3^- in air but only 27% under N_2. Up to 90% of NH_4^+ supplied in a continuous spray of meltwater was retained by the lichen but this was affected little by O_2 and CO_2 deprivation. (Auth.)

B-55896

Schroeter, B., Sancho, L.G., **Lichens growing on glass in Antarctica,** *Lichenologist,* 1996, 28(4), p.385-390, Refs. p.389-390.

Early stages of lichen colonization on glass are reported for the first time from Antarctica. In the initial establishment of the lichen thallus, rhizomorphs play an important role for the attachment to the substratum and the exploitation of nutrient and photobiont resources. The micrographs presented indicate that in Antarctica colonization of bare substrata by lichens is not necessarily an extremely slow process. Furthermore, the findings demonstrate that the use of artificial substrata such as glass could provide a simple method for studies in lichen colonization and development in extreme environments. (Auth.)

B-55897

Kennedy, A.D., **Antarctic fellfield response to climate change: a tripartite synthesis of experimental data,** *Oecologia,* 1996, 107(2), p.141-150, 42 refs.

This paper explores the biological consequences of climate change by integrating the results of a tripartite investigation involving fumarole, field manipulation and laboratory incubation experiments. The geographical region for this research is the maritime Antarctic. Under contemporary climate conditions, the lithosols in this region support only a sparse cryptogamic flora of limited taxonomic diversity and low structural complexity. However, the existence in geothermal areas of temperate species growing outside their normal biogeographical range suggests that elevated temperature and humidity may alter the trajectory of community development towards Magellanic or Patagonian composition. Barren fellfield soil samples transplanted to the laboratory and incubated at temperatures of 2-25°C show rapid development of moss, algae and lichen propagules in the range 15-25°C. A variety of species develop that have not been recorded in the field. It is argued that the combined results of this synthesis identify generic responses to climate change arising from the importance at high latitudes of low temperature and water availability as limiting factors: subject to other growth resources being non-limiting, a more consistent stimulatory response to climate change may be expected than in temperate or tropical regions. (Auth. mod.)

B-55925

Irgens, R.L, Gosink, J.J., Staley, J.T., ***Polaromonas vacuolata* gen. nov., sp. nov., a psychrophilic, marine, gas vacuolate bacterium from Antarctica,** *International journal of systematic bacteriology,* July 1996, 46(3), p.822-826, 17 refs.

Several strains of a novel heterotrophic gas vacuolate bacterium were isolated rom antarctic marine waters. The results of phylogenetic analyses in which 16S ribosomal DNA sequencing was used, coupled with phenotypic tests, indicated that strain 34-P^T (T=type strain) belongs to a new genus and species of the beta subgroup of the *Proteobacteria,* for which the name *Polaromonas vacuolata* is proposed. Although the other four strains studied probably belong to this new species, DNA-DNA hybridization tests were not conducted. The closest phylogenetic relatives of *P. vacuolata* are the photosynthetic nonsulfur purple bacterium *Rhodoferax fermentans* and the hydrogen autotroph *Variovorax paradoxus.* (Auth.)

B-55926

Janssen, J., **Use of the lateral line and tactile senses in feeding in four antarctic nototheniid fishes,** *Environmental biology of fishes,* Sep. 1996, 47(1), p.51-64, 40 refs.

Fishes of the family Nototheniidae (Pisces:Perciformes) dominate antarctic fish communities and have radiated to fill diverse niches. The most southern species must operate under an extended austral night and under thick sea ice, yet have eyes more typical of shallow coastal fishes. In winter, the eyes are probably useless, except for detecting bioluminescence. The author compared the responses of four species to hydromechanical and tactile signals: two benthivores, *Trematomus bernacchii* and *T. pennellii,* a benthic planktivore, *T. nicolai,* and *Pagothenia borchgrevinki,* which feeds near the ice undersurface and within ice cracks. The planktivores have dorsal mouths, with eyes oriented dorsally or laterally *(Pagothenia);* their lateral line canals and receptor organs are larger dorsally. The benthivores have more ventrally oriented mouths and eyes. All species responded to hydromechanical cues to the head, but only the two benthivores responded to trunk hydromechanical stimuli or tactile stimuli to the ventral trunk or pelvic fins. Possibly responses to plankton along the trunk are of little use if a reorientation washes pelagic prey away. (Auth. mod.)

B-55928

Iorizzi, M., De Marino, S., Minale, L., Zollo, F., Le Bert, V., Roussakis, C., **Investigation of the polar steroids from an antarctic starfish of the family *Echinasteridae*: isolation of twenty-seven polyhydroxysteroids and steroidal oligoglycosides, structures and biological activities,** *Tetrahedron,* Aug. 12, 1996, 52(33), p.10,997-11,012, 37 refs.

An investigation of the extracts from a starfish collected in the southern ocean, *Echinasteridae* family, has led to the isolation of thirteen glycosides of polyhydroxysteroids (1-13), fourteen polyhydroxysteroids (14-27), which are the subject of this report, and seven asterosaponins (penta- and hexa-saccharides), described in a previous paper. Glycosides 1-13 are composed of the same 3β, 4β, 6α, 8, 15β, 26-hexahydroxysteroidal aglycone with small variations in the side chains, and a carbohydrate portion made up of one or two monosaccharide units attached at C-26, except 11, which has a steroidal aglycone with a 24,28-dihydroxylated side chain and the monosaccharide unit attached at C-24. The structures of the polyhydroxysteroids (14-27) have the hydroxyl groups typically disposed on one side of the steroid nucleus, i.e. 3β, 4β, 6β (or α), 8, 15α (or β) and 16β and the majority of them possess a 26-hydroxyl function. A selection of fifteen compounds were tested against human non-small-cell lung carcinoma cells and found to be moderately cytotoxic. (Auth.)

B-55935

Peña Cantero, A.L., Vervoort, W., **Redescription of *Oswaldella antarctica* (Jäderholm, 1904) (Cnidaria Hydrozoa) with notes on related species (Notes on antarctic hydroids, I),** *Zoologische mededelingen (Leiden),* 1995, 69(15-29), p.329-340, With Spanish summary. 17 refs.

Jäderholm's type of *Schizotricha antarctica,* collected by the Swedish Antarctic Expedition 1901-1903, is redescribed from a syntype in the collections of the Swedish National Museum, Stockholm. The type lot of that species proved to be composite, the material best resembling Jäderholm's (1904, 1905) descriptions and figures has been designated as the syntype. There are two more species in the type lot that have also been described, but are too poorly represented to be either recognized as one of the described species of *Oswaldella* or to merit a new specific name; they have been indicated as *Oswaldella* spec. 1 and spec. 2. (Auth.)

B-55936

Peña Cantero, A.L., García Carrascosa, A.M., Vervoort, W., **On two antarctic species of *Oswaldella* Stechow, 1919: *O. shetlandica* Stepan'yants, 1979 and *O. elongata* spec. nov. (Cnidaria Hydrozoa) (Notes on antarctic hydroids, II),** *Zoologische mededelingen (Leiden),* 1995, 69(15-29), p.341-351, With Spanish summary. 12 refs.

Two species of the antarctic hydroid genus *Oswaldella* Stechow, 1919, are considered. The first, described by Stepan'yants (1979) as a subspecies, *O. billardi shetlandica,* has been raised to a specific level and will henceforth be indicated as *O. shetlandica* Stepan'yants, 1979. A second species is described as *Oswaldella elongata* spec. nov. Both species are differentiated against the remaining known species of *Oswaldella;* new records are added and the geographic distribution is discussed. (Auth.)

B-55937

Weidinger, K., **Egg variability and hatching success in the Cape petrel *Daption capense* at Nelson Island, South Shetland Islands, Antarctica,** *Journal of zoology,* Aug. 1996, 239(4), p.755-768, Refs. p.766-768.

Eggs of the Cape petrel *Daption capense* at Nelson I. exhibited high variability in volume between females (up to 48%), while for each individual female, both volume and shape of eggs were highly correlated over two seasons. Both female size and body condition at laying were unrelated to egg volume in the 'good' season 1991, but larger females produced larger eggs in the 'bad' season 1990, when eggs were smaller on average. In 1991, females in better body condition, but not larger, started laying earlier. Egg volume differed significantly between the two years, which could not be explained by changes in the breeding population or timing of breeding. The laying of relatively small eggs and low overall breeding success in 1990 most probably reflected changes in food availability. Overall hatchability was 88% and did not differ significantly between disturbed and control colonies in 1991. (Auth. mod.)

B-55938

Arnould, J.P.Y., Boyd, I.L., Speakman, J.R., **Relationship between foraging behaviour and energy expenditure in antarctic fur seals,** *Journal of zoology,* Aug. 1996, 239(4), p.769-782, Refs. p.780-782.

By using time-depth recorders to measure diving activity and the doubly-labelled water method to determine energy expenditure, the relationship between foraging behavior and energy expenditure was investigated in 9 antarctic fur seal females rearing pups. At-sea metabolic rate (MR) was positively correlated to foraging trip duration. There were no relationships between MR and the total number of dives, the total time spent diving or the total vertical distance travelled during the foraging trip. The rate of diving was negatively related to at-sea MR. Body mass gain during a foraging trip had a positive relationship to the time spent at sea and the total amount of energy expended while at sea such that, while females undertaking long trips have higher metabolic rates, the energetic efficiency with which females gain mass is independent of the time spent at sea. Therefore, within the range of conditions observed, there is no apparent energetic advantage for females in undertaking foraging trips of any particular duration. (Auth. mod.)

B-55958

Davidson, M.M., Broady, P.A., **Analysis of gut contents of *Gomphiocephalus hodgsoni* Carpenter (Collembola: Hypogastruridae) at Cape Geology, Antarctica,** *Polar biology,* Aug. 1996, 16(7), p.463-467, 20 refs.

The diet of the collembolan *Gomphiocephalus hodgsoni* was investigated by microscopic examination of the contents of 197 fecal pellets and 32 guts collected at Cape Geology. Animals came from 9 contrasting microhabitats, ranging from mineral soils to bryophyte cushions. Thirty-two different types of ingested material were recognized. Detritus, filamentous cyanobacteria, eukaryotic microalgae and fungal hyphae were the most frequent. There were marked contrasts between individuals collected from different microhabitats, which probably reflected food availability. There was some selectivity in that neither living moss tissue nor the macroscopic chlorophyte alga *Prasiola crispa* was encountered in feces or guts, despite their being abundant in some microhabitats. A comparison of active and inactive animals showed the latter to have a significantly higher proportion of empty guts and of guts containing fat globules. (Auth.)

B-55959

Reid, K., Croxall, J.P., Prince, P.A., **Fish diet of black-browed albatross *Diomedea melanophris* and grey-headed albatross *D. chrysostoma* at South Georgia,** *Polar biology,* Aug. 1996, 16(7), p.469-477, 35 refs.

The fish component of the diet of black-browed and grey-headed albatrosses at South Georgia was investigated by intercepting 155 meals from adults arriving to feed chicks during Feb. 1986 and 1994. Fish represented 30% and 72% by mass of the diet of black-browed albatrosses and 14% and 60% by mass of the diet of grey-headed albatrosses in 1986 and 1994 respectively. The authors determined the identity and quantified the contribution (by numbers, size and mass) of fish species mainly by using otoliths (54 representing 9 taxa and 57 representing 17 taxa in black-browed and grey-headed albatross samples respectively). For black-browed albatrosses in 1986 the main fish prey was *Patagonotothen guntheri* and a single large specimen of *Icichthys australis*, whereas in 1994 *Pseudochaenichthys georgianus* was the main fish prey. Grey-headed albatross samples from 1986 were dominated by southern lampreys, lanternfish and *P. guntheri;* in 1994 *Champsocephalus gunnari, Magnisudis prionosa, Muraenolepis microps, P. georgianus* and lanternfish were the main prey. The importance of *P. guntheri* to both species in 1986 and its absence in 1994 probably reflect albatrosses obtaining it from the commercial fishery, which was active in 1986 but closed in 1994. (Auth. mod.)

B-55960

Kawaguchi, S., Takahashi, Y., **Antarctic krill (*Euphausia superba* Dana) eat salps,** *Polar biology,* Aug. 1996, 16(7), p.479-481, 16 refs.

Feeding behavior of antarctic krill *(Euphausia superba)* on salps was observed in shipboard experiments during the 1994-95 *Kaiyo Maru* antarctic ocean research cruise. The feeding rate was more than 0.5 salp/krill per day. When offered ethanol extracts of four prey types, salps, phytoplankton, krill and polychaetes, krill preferred the salp extracts. This evidence implies that the substances extracted from salps were most attractive to krill. These results might indicate a tight ecological relationship between krill and salps. (Auth.)

B-55961

Martínez, R., **Psychrophilic and psychrotrophic respiratory metabolism in antarctic microplankton,** *Polar biology,* Aug. 1996, 16(7), p.483-489, 35 refs.

The activity of the respiratory Electron Transfer System (ETS) was measured in total microplankton (<200-μm size fraction) and nanoplankton (<20-μm size fraction) from the Bransfield Strait in Jan. 1994. Activity variation in response to temperature was measured at 3 stations belonging to 3 different water masses that showed *in situ* temperatures ranging from -0.57 to 1.30°C. Subsamples from each station were assayed for ETS activity at 11 temperatures in the -3 to 20°C range. Results showed a bimodal activity-temperature variation in plankton from the lower *in situ* temperatures, with a peak in activity at 0°C, and a minimum at 3°C, with subsequent continuous increase up to absolute maxima at 15°C. The water mass with higher than 0°C temperature did not show the 0°C activity peak. Results suggest the existence, in water masses with in situ temperature near or below 0°C, of psychrophilic microbial populations with a narrow temperature range of respiratory enzyme activity, coexisting with more numerous and widespread psychrotrophs, or cold-tolerant populations, whose ETSs showed a continuous increase in activity in the -3 to 15°C temperature range. The existence of differentiated biochemical adaptations and acclimations to low temperature in polar plankton is pointed out. (Auth. mod.)

B-55962

Erséus, C., Rota, E., **Tubificidae (Oligochaeta) from the Ross Sea (Antarctica), with descriptions of one new genus and two new species,** *Polar biology,* Aug. 1996, 16(7), p.491-496, 18 refs.

Three species, *Torodrilus gelidus* n.sp. (subfamily Rhyacodrilinae), *Rossidrilus terraenovae* n.gen. and n.sp. (Limnodriloidinae), and a second unnamed species of Limnodriloidinae, are reported from marine sediments in Terra Nova Bay. *T. gelidus* is distinguished from *T. lowryi* Cook, 1970 by its setal pattern (with few exceptions, both anterior and posterior setae are single-pointed in sexually mature specimens of *T. gelidus)* and the morphology of its male protuberances (the latter folded over a mid-ventral bursa in segment XI). *R. terraenovae* is characterized by large diverticula attached to the esophagus in the posterior part of segment IX, unpaired male and spermathecal pores, heavily muscular and ciliated atrial ampullae, elongate prostatic pads, and a deep, unpaired and muscular, copulatory sac. It is the first species of its subfamily to be described from antarctic waters. (Auth.)

B-55963
Gili, J.M., Alvà, V., Pagès, F., Klöser, H., Arntz, W.E., **Benthic diatoms as the major food source in the sub-Antarctic marine hydroid *Silicularia rosea*,** *Polar biology,* Aug. 1996, 16(7), p.507-512, Refs. p.511-512.

Analysis of the gut contents and scanning electron microscopy examination of the benthic hydroid *Silicularia rosea* from intertidal communities of Potter Cove suggest that diatoms are the principal source of food for this species. The great number of items captured daily by each polyp (a mean of 287 in Jan. and 162 in Dec.) and the benthic origin of these prey items suggest an adaptation to daily resuspension processes caused by tidal currents. This is an unusual trophic strategy for a benthic hydroid, which would result in an important degree of independence from the highly fluctuating planktonic food conditions in antarctic waters. (Auth.)

B-55964
Bargagli, R., Nelli, L., Ancora, S., Focardi, S., **Elevated cadmium accumulation in marine organisms from Terra Nova Bay (Antarctica),** *Polar biology,* Aug. 1996, 16(7), p.513-520, Refs. p.519-520.

As a contribution towards identification of the principal environmental factors involved in cadmium accumulation in antarctic marine organisms and the establishment of a baseline near Terra Nova Bay Station, surface sediments, plankton and benthic organisms were studied in coastal waters of the Bay (Ross Sea). The cadmium content of sediments was similar to that regarded as background in most marine coastal areas, whereas in surface water, phyto- and zooplankton it was similar to values measured in areas of enhanced upwelling. Algal and animal taxa dominating benthic associations had a higher cadmium content than related species from other seas. Very high concentrations of the metal were found in sponges (10-80 µg/g dw) and in the digestive gland of molluscs (up to 345 µg/g in *Neobuccinum eatoni).* The rapid regeneration of cadmium and its natural occurrence and bioavailability in highly productive coastal waters seem to be responsible for cadmium accumulation in the tissues of marine organisms near the Terra Nova Bay Station. (Auth.)

B-55965
Schreiber, A., Eisinger, M., Storch, V., **Allozymes characterize sibling species of bipolar Priapulida (*Priapulus, Priapulopsis*),** *Polar biology,* Aug. 1996, 16(7), p.521-526, Refs. p.525-526.

Electrophoretic polymorphism of glucosephosphate isomerase (Gpi*) and phosphogluocomutase (Pgm*) polymorphisms were assayed in the bipolar-disjunct species pairs *Priapulus caudatus/P. tuberculatospinosus* and *Priapulopsis bicaudatus/Priapulopsis australis* (phylum Priapulida). Numbers of genotypes from Gpi* alleles and 14 Pgm* alleles generally did not show deviations from Hardy-Weinberg expectations in composite populations sampled over geographic distances up to 500 km linearly measured. This genetic pattern suggests efficient population cohesion in a phylum where pelagic larvae have not been observed. Sibling species in genera *Priapulus* or *Priapulopsis* from northern and southern polar seas did not share identical allozyme alleles. (Auth.)

B-55966
Kirkwood, J.M., **Developmental rate of *Euphausia crystallorophias* larvae in Ellis Fjord, Vestfold Hills, Antarctica,** *Polar biology,* Aug. 1996, 16(7), p.527-530, 24 refs.

Euphausia crystallorophias is the dominant zooplankton species in the neritic seas of Antarctica, where it occurs in similar abundances to those of *Euphausia superba* in more offshore areas. Despite its great abundance and probable ecological significance, few details are known of this species' development, life history and ecology. This study found that *E. crystallorophias* spawned in Ellis Fjord from late Nov. to early Dec. and completed its larval development under the sea ice during the antarctic winter. The mean time for *E. crystallorophias* eggs to develop to furcilia stage VI was 235.5 days, which is virtually identical to the developmental time already reported in the laboratory, but almost twice that of *E. superba.* This slow development rate is likely to be due either to the low water temperatures (<0°C) in which *E. crystallorophias* lives, or to low levels of food being available over winter. (Auth.)

B-55971
Ingole, B.S., Parulekar, A.H., **Biochemical composition of antarctic zooplankton from the Indian Ocean sector,** *Indian journal of marine sciences,* June 1995, 24(2), p.73-76, 25 refs.
DLC GC721.I48

Zooplankton samples were analyzed for faunal composition, organic carbon, protein, carbohydrate and lipid content. Total zooplankton biomass (as displacement volume) varied from 0.032 to 0.500 ml/m^3 in upper 200 m with significant differences between the antarctic and the subantarctic waters. Calanoid copepods were numerically the predominant group comprising ≥80% of total counts, whereas euphausiid *Euphausia superba* was abundant in samples collected south of lat. 55°S. Organic carbon concentrations ranged from 0.83 to 13.04 mgC/m^3. Lipid was the principal biochemical component, varying between 11.08 to 27.65%. Protein content showed large variations and ranged between 8.02 and 29.9%. Values for carbohydrate content varied from 11.01 to 27.65%. Higher accumulation of lipids in antarctic zooplankton during phytoplankton blooms (austral summer) could be an adaptative phenomenon, and may function as metabolic reserve and insulation layer. (Auth. mod.)

B-55973
Berry, W.B.N., Quinby-Hunt, M.S., Wilde, P., **Impact of Late Ordovician glaciation-deglaciation on marine life,** Studies in Geophysics: Effects of past global change on life. (Board on Earth Sciences and Resources, Commission on Geosciences, Environment, and Resources, National Research Council), Washington, D.C., National Academy Press, 1995, p.34-46, Refs. p.44-46.
DLC QE720.E32 1995

Sea level fell at least 50 m during Late Ordovician continental glaciation which centered on the South Pole. Oxygen isotope analyses indicate that ocean surface waters cooled during glaciation. As sea level fell and surface waters cooled, mass mortalities occurred among most marine benthic faunas, primarily brachiopods and trilobites. Carbon isotope analyses reveal a significant biomass loss at the time of the mass mortalities. The brachiopod-dominated *Hirnantia* fauna spread widely during glacial maximum. That fauna essentially became extinct during deglaciation. Cold, oxygen-rich deep ocean waters generated at the South Pole during glaciation drove a strong deep ocean circulation and ventilated the deep oceans. Potentially, waters bearing metal ions and other substances toxic to organisms were advected upward into ocean mixed layer during glacial maximum. Graptolite mass mortality apparently was a consequence. Mass mortalities took place among pre-*Hirnantia* brachiopod and trilobite faunas at the same time as the graptolite mass mortality. Reradiation among graptolites and benthic marine faunas followed after sea-level rise, and deep ocean circulation slowed as deglaciation proceeded. (Auth. mod.)

B-55974
Kennett, J.P., Stott, L.D., **Terminal Paleocene mass extinction in the deep sea: association with global warming,** Studies in Geophysics: Effects of past global change on life. (Board on Earth Sciences and Resources, Commission on Geosciences, Environment, and Resources, National Research Council), Washington, D.C., National Academy Press, 1995, p.94-107, Refs. p.105-107.
DLC QE720.E32 1995

The end of the Paleocene Epoch was marked by an abrupt, worldwide extinction of deep-sea benthic organisms. High-resolution stratigraphic studies in deep-sea sediments indicate that the extinction occurred in less than 3000 yr. Foraminiferal oxygen and carbon stable isotope changes, in combination with a distinct change in benthic fauna, indicate an abrupt but temporary warming and oxygen depletion of deep waters related to a fundamental change in oceanic circulation. The available data point to an ocean temporarily dominated by warm saline deep water whose source was probably in the mid-latitudes. This increase in surface water temperatures was particularly pronounced in the Antarctic during the latest Paleocene, as reflected by the relatively brief appearance of the subtropical-tropical morozovellid group and a peak in discoaster abundance. The emigration of these warm-loving planktonic microfossils to the antarctic was particularly pronounced during the mass extinction. In one antarctic site 32% of the planktonic foraminiferal species appeared for the first time in the latest Paleocene, 27% underwent major abundance changes, and only 13% were eliminated from the assemblages. Most new entries were surface dwellers. Of those that were eliminated, most were deeper dwellers such as the subbotinids. (Auth. mod.)

B-55979

Atkinson, A., Ward, P., Murphy, E.J., **Diel periodicity of Subantarctic copepods: relationships between vertical migration, gut fullness and gut evacuation rate,** *Journal of plankton research,* Aug. 1996, 18(8), p.1387-1405, Refs. p.1404-1405.

A zooplankton community north of South Georgia was sampled for 5 days in Feb. 1994. Feeding of various copepodite stages of 6 copepod species was assessed by a series of gut fluorescence/gut evacuation experiments. Feeding periodicity was compared to vertical distribution and migration patterns. Despite chlorophyll *a* levels reaching only 0.8 mg/m^3 and daily carbon rations based on phytoplankton intake being low, feeding of all the copepods was restricted mainly to the 8 h night-time period. During the daytime, the epipelagic community was vertically dispersed within the top 100 m. At night, upward migration by most species led to a convergence of almost all zooplankters in the upper half of the surface mixed layer. However, large-amplitude vertical migrations which crossed the thermocline were performed only by *Metridia lucens* and *Pleuromamma robusta.* Although feeding by both migrants and non-migrants was mainly at night, there was no diel signal in gut evacuation rate. (Auth. mod.)

B-55980

Frazer, T.K., **Stable isotope composition ($\delta^{13}C$ and $\delta^{15}N$) of larval krill, *Euphausia superba*, and two of its potential food sources in winter,** *Journal of plankton research,* Aug. 1996, 18(8), p.1413-1426, Refs. p.1425-1426.

Natural abundances of $^{13}C(\delta^{13}C)$ and $^{15}N(\delta^{15}N)$ were measured in larval krill, suspended particulate organic matter (POM) and ice-associated POM during early and late winter along the west coast of the Antarctic Peninsula. Larval krill were enriched in ^{13}C relative to both larvae and adults sampled during summer months. Elevated $\delta^{13}C$ values were also recorded in suspended POM during early winter. These data imply that seasonal shifts in the isotopic composition of larval krill need not result from changes in diet and mechanisms other than CO_2 limitation in the ice can account for ^{13}C enrichments in ice-associated POM. Stable carbon isotopes could not be used, in this study, to discern between suspended POM and ice-associated POM as alternative food sources for larval krill. During one early winter sampling period, larval krill were markedly depleted in ^{15}N, suggesting that they are primarily herbivorous prior to exploiting ice-associated food resources. Mechanisms are proposed to explain variation in the isotopic composition of POM and larval krill, and will be of particular interest to those investigating food web dynamics and biogeochemical processes in the region. (Auth.)

B-55981

Ward, P., Shreeve, R.S., Cripps, G.C., ***Rhincalanus gigas* and *Calanus simillimus*: lipid storage patterns of two species of copepod in the seasonally ice-free zone of the Southern Ocean,** *Journal of plankton research,* Aug. 1996, 18(8), p.1439-1454, Refs. p.1452-1454.

The lipid and hydrocarbon composition of two species of antarctic copepod, *Rhincalanus gigas* and *Calanus simillimus,* was investigated at two contrasting sites. Differences in the quantity of total lipid between sites were pronounced for *R. gigas;* females from a station near South Georgia where a bloom was in progress contained ca. 8 times as much as those sampled in post-bloom waters in the Polar Frontal Zone (PFZ) some 450 km further north. In contrast, differences between sites for *C. simillimus* were less pronounced. The main lipid class for *R. gigas* was wax ester and for *C. simillimus* triacylglycerol. This fundamental difference is thought to reflect varying life-history patterns suggesting that *C. simillimus* may not undergo periods of pronounced food shortage. Pristane, a metabolite of phytol derived through the degradation of chlorophyll, was present in both species at both sites, indicating recent feeding activity, but the lack of the polyene diatom marker $C_{21:6}$ in *C. simillimus* at the PFZ station suggested that it was largely feeding on other microplankton. Fatty acid analysis of *C. simillimus* offered further evidence that this species was omnivorous and that *R. gigas* was predominantly herbivorous. (Auth. mod.)

B-55982

Froneman, P.W., Perissinotto, R., McQuaid, C.D., **Dynamics of microplankton communities at the ice-edge zone of the Lazarev Sea during a summer drogue study,** *Journal of plankton research,* Aug. 1996, 18(8), p.1455-1470, Refs. p.1467-1470.

Microzooplankton grazing and community structure were investigated in the austral summer of 1995 at the ice-edge zone of the Lazarev Sea. Grazing was estimated at the surface chlorophyll maximum (5-10 m) by employing the sequential dilution technique. Chlorophyll *a* concentrations were dominated by chain-forming microphytoplankton of the genera *Chaetoceros* and *Nitzschia*. Microzooplankton were numerically dominated by aloricate ciliates and dinoflagellates. Instantaneous growth rates of nanophytoplankton varied between 0.019 and 0.080/day. Instantaneous grazing rates of microzooplankton on nanophytoplankton varied from 0.012 to 0.052/day. This corresponds to a nanophytoplankton daily loss of between 1.3 and 7.0% of the initial standing stock, and between 45 and 97% of the daily potential production. Growth rates of microphytoplankton were lower, varying between 0.011 and 0.070/day. At only 3 of the 10 stations did grazing by microzooplankton result in a decrease in microphytoplankton concentration. Data show that microzooplankton grazing at the ice edge were not sufficient to prevent chlorophyll *a* accumulation in regions dominated by microphytoplankton. Here, the major biological routes for the uptake of carbon therefore appear to be grazing by metazoans or the sedimentation of phytoplankton cells. (Auth. mod.)

B-55984

Willen, E., **Two new genera of Laophontidae (Copepoda: Harpacticoida) from the high Antarctic Weddell Sea,** *Journal of natural history,* Sep. 1996, 30(9), p.1297-1327, Refs. p.1325-1327.

Two new genera of the harpacticoid family Laophontidae from the Weddell Sea are described. At present, both taxa cannot be assigned to any of the known genera or lineages of the family. The Antarctic shows the greatest degree of endemism worldwide in several already investigated taxa and, considering the available records, the Laophontidae appear to be no exception to this rule. The available data on the Laophontidae of the Weddell Sea seem to support a hypothesis of an 'old' antarctic fauna rather than a recolonization by 'phylogenetic younger' taxa after the major climatic changes, which took place in the antarctic continent and the surrounding waters from the Miocene onwards. (Auth.)

B-55988

Vincent, W.F., ed, **Environmental management of a cold desert ecosystem: the McMurdo Dry Valleys. Report of a National Science Foundation Workshop held at Santa Fe, New Mexico, 14-17 March, 1995,** Reno, NV, Desert Research Institute, University of Nevada, 1996, 57p., Refs. p.40-42.

The McMurdo Dry Valleys is a cold desert environment containing the most expansive tracts of ice-free land on the antarctic continent. In Mar. 1995, a workshop sponsored by the National Science Foundation was held in Santa Fe, NM, to address the environmental concerns about this region and to formulate the first steps towards an integrated strategy for managing the Dry Valleys. Guidelines were developed for environmental monitoring within the context of the management plan. Two sets of practical guidelines were formulated to help individuals meet their environmental responsibilities in the Dry Valleys: an environmental checklist for the planning phase of new and ongoing science projects, and an Environmental Code of Conduct for all personnel working in the field.

B-55993

Ostrovskiĭ, A.N., Taylor, P.D., **Systematics of some antarctic *Idmidronea* and *Exidmonea* (Bryozoa: Cyclostomata),** *Journal of natural history,* Oct. 1996, 30(10), p.1549-1575, 35 refs.

Descriptions are given of seven antarctic species of cyclostome bryozoans belonging to the genera *Idmidronea* and *Exidmonea,* of which *I. fraudulenta, I. pellucida* and *E. arcuata* are new. The gonozooids of *I. pseudocrisina* Borg are described for the first time, and all species are newly illustrated using SEM. The large sample size available has permitted particular attention to be given to intraspecific variability, especially of the ooeciostome which is shown to be more variable than has been previously acknowledged. (Auth.)

B-56016

Robinson, S.A., Hindell, M.A., **Foraging ecology of Gentoo Penguins *Pygoscelis papua* at Macquarie Island during the period of chick care,** *Ibis,* Oct. 1996, 138(4), p.722-731, 39 refs.

The diet, diving behavior, swimming velocity and foraging range of Gentoo penguins were studied at Macquarie I. during the breeding season in the 1993-94 austral summer. Gentoo penguins are considered to be inshore feeders, and at Macquarie I. the diet and estimated foraging ranges supported this. The diet consisted of 91.6% fish and 8.3% squid, by mass. A mixture of pelagic and benthic prey was consumed, with a greater proportion of benthic species occurring later in the season. The penguins exhibited a strong diurnal pattem in their diving behavior. Early in the breeding season, dive profiles indicated that birds were probably following vertically migrating pelagic prey through the water column and were foraging in waters over 100 m deep. Gentoo penguins had a maximum potential foraging range of about 26 km for single-day trips. They tended to forage within 14 km of the colony, with a mean range of 5.4 km. This range encompassed the deep ocean habitat to the west and east of the island and a shallow area to the north. (Auth. mod.)

B-56017

Barnes, D.K.A., Bullough, L.W., **Some observations on the diet and distribution of nudibranchs at Signy Island, Antarctica,** *Journal of molluscan studies,* Aug. 1996, 63(pt.3), p.281-287, 25 refs.

Observations were made on the diet and distribtion of eight species of nudibranchs found in Borge Bay, Signy I. Specimens from seven sites were examined on four separate occasions during 1992 and 1993. A small collection for identification was also made. Six of the eight species present were identified, and the first ecological data for at least one species *(Charcotia granulosa)* were recorded. Two unidentified aeolid species occurred almost entirely on particular hydroids and the prey of *Tritonia antarctica* was not apparent. The physical size of antarctic nudibranchs may have important implications to the type of prey and feeding strategy used by different species. (Auth. mod.)

B-56034

Zernova, V.V., **Floristic zonation of the southern ocean** [O floristicheskom raĭonirovanii iuzhnogo okeana], *Antarktika,* 1993, No.32, p.141-150, In Russian with English summary. 22 refs.

Floristic similarity between stations was studied at 26 meridional transects in the southern ocean, using the Djacar method. Five of these situated in the Pacific sector of Antarctica were analyzed more thoroughly. The transects were made from Dec. to May and give an accurate picture of the seasonal variations of phytoplankton during the growing season. Results show that the coefficient of floristic similarity between the stations and the position of the main floristic area (group of stations) changes with the season. In spring the main area was found in subantarctic waters with the Antarctic Polar Front as its southem limit. In summer the main area was situated in antarctic waters to the south of the Antarctic Polar Front. In autumn the coefficient of floristic similarity gradually decreases, first in subantarctic, then in antarctic waters. (Auth.)

B-56035

Egorova, E.N., **Antarctic bivalve molluscs - Cuspidaria (*Cuspidariidae, Cuspidatiida, Bivalva*)** [Antarkticheskie dvustvorchatye molliuski - kuspidarii (*Cuspidariidae, Cuspidatiida, Bivalva*)], *Antarktika,* 1993, No.32, p.151-166, In Russian with English summary. 9 refs.

A critical comparison has been made of the various *Cuspidaria* shells collected by a number of Soviet Antarctic Expeditions. Although there was some difficulty in identifying small, thin shells which were very similar in appearance, a systematic examination was carried out of the outlines and proportions, surface sculpture and structure of the dentition margin of the shells. The figures show some specific variations for different growth stages. Two genera were differentiated mainly on the basis of some peculiarities of concentric sculpture and the structure of the dentition margin. The former genus *Cuspidaria* includes the three known species *C. infelix, C. plicata, C. tenella* and one new species, *C. multicostata.* The new genus Subcuspidaria includes two already known species *C. Kerguelenensis* and *C. concentrica* which differ from other cuspidarian species in similar ways and should be considered a new genus. The generitype is *Subcuspidaria kerguelenensis. Subcuspidaria minima,* a new species of this genus, has somewhat different characteristic features in shell outlines and in concentric sculpture. (Auth.)

B-56036

Vekhov, N.V., **Fresh- and salt-water invertebrates (Rotifers and Crustaceans) of the southern circumpolar regions (review of fauna and research results)** [Bespozvonochnye zhivotnye (Kolovratki, nizshie rakoobraznye) presnykh i solonovatykh vod iuzhnoĭ tsirkumpoliarnoĭ oblasti (obzor faunyi itogi issledovaniĭ], *Antarktika,* 1993, No.32, p.167-187, In Russian with English summary. 76 refs.

The author presents the first ever discussion of all the results obtained from numerous studies of Rotifers and Crustaceans, the most common aquatic invertebrates of Antarctica. An analysis of published results shows that the fresh- and salt waters of the continent and islands in the southem circumpolar region are the habitat of approximately 100 species and subspecies of Rotifers and 24 species and sub-species of Crustaceans. 75% of Rotifers found in the region are cosmopolites, 18% are endemic to Antarctica and the Subantarctic, and only 8% have a distribution throughout the Southem Hemisphere. The author proposes a division into zoogeographical areas in Antarctica and the Subantarctic based on population data for Rotifers and Crustaceans. (Auth.)

B-56038

Klopov, V.P., et al, **Biochemical aspects of the readaptation of an organism after a period spent in Antarctica** [Biokhimicheskie aspekty readaptatsii organizma posle prebyvaniia v usloviiakh antarktidy], *Antarktika,* 1993, No.32, p.195-200, In Russian with English summary. 11 refs.

The paper presents the results of studies on the physiological and biochemical parameters of laboratory animals (white rats) during a 3.5-month readaptation period after their retum from Antarctica by air in 1989 and by sea in 1991. These show that the translatitudinal transference of the animals was accompanied by considerable expenditure of energy and weight loss in both groups. Although the readaptation period was broadly similar, independent of the means of transportation, the acute readaptation period (the first two weeks after departure from Antarctica) was accompanied by a more pronounced stress reaction in animals transported by air. In both groups the use of imidazol drugs produced positive effects only in the acute readaptation period. Use of these drugs in the following period caused changes in the parameters of the organism's antioxidant system. (Auth.)

B-56041

Delille, D., Fiala, M., Razouls, S., **Seasonal changes in bacterial and phytoplankton biomass in a subantarctic coastal area (Kerguelen Islands),** *Hydrobiologia,* Sep. 9, 1996, 330(2), p.143-150, 63 refs.

The seasonal variations of bacterial and phytoplankton biomass were studied during several pluri-annual surveys in the subantarctic Morbihan Bay, Kerguelen Is. Large interannual variation was observed. Phytoplanktonic biomass showed moderate values during winter and autumn. They increased sharply in spring; a second phytoplanktonic bloom of similar amplitude occurred in late summer. During algal blooms which were roughly associated with optimal values of solar irradiation for the first one and with the highest temperatures for the second one, phytoplanktonic material represented near 100% of particulate and living carbon. Bacteria showed maximal abundance during summer or autumn. Their relative abundance, which represented less than 1% of the living biomass in spring and summer, can reach more than 95% in autumn and winter. (Auth. mod.)

B-56050

Judson, M., **Identity of the Antarctic mite *Gainia nivalis* Trouessart (Acari, Nanorchestidae),** *Paris. Muséum national d'histoire naturelle. Bulletin. Série 4,* 1995, 17(1-2), p.83-86, With French summary. 17 refs.

The types of *Gainia nivalis* Trouessart, 1914, from Petermann I. (Antarctic Peninsula), have been re-examined and a lectotype designated. *Gainia* Trouessart, 1914, is confirmed to be a junior subjective synonym of *Nanorchestes* Topsent and Trouessart, 1890. *Nanorchestes nivalis* (n. comb.) is a senior subjective synonym of *N. gressitti* Strandtmann, 1982 (n. syn.). Authorship of the family name Nanorchestidae is attributed to Berlese, 1913. (Auth.)

B-56051

Monniot, C., Monniot, F., **Ascidians collected in the Weddell Sea by the RV "Polarstern" (EPOS cruise leg 3),** *Paris. Muséum national d'histoire naturelle. Bulletin. Série 4,* Jan.-Mar. 1994, 16(1), p.13-37, With French summary. Refs. p.36-37.

Samples collected with several devices in the Weddell Sea contained 36 ascidian species. Four new species are described. The anatomy and distribution of the other species are commented upon. This antarctic ascidian fauna is compared with previous results from the Antarctic Peninsula, the Ross Sea and subantarctic areas. Affinities with the deep sea fauna are considered. (Auth.)

B-56052

Teodorczyk, W., Wägele, J.W., **On Antarctic species of the genus *Munna* Krøyer, 1839 (Crustacea, Isopoda, Asellota, Munnidae),** *Paris. Muséum national d'histoire naturelle. Bulletin. Série 4,* Jan.-Mar. 1994, 16(1), p.111-201, With French summary. Refs. p.200-201.

Based on type material from museums, on collections from the European "Polarstern" Expedition (EPOS) and from Polish expeditions to King George I., 16 poorly known and new antarctic and subantarctic species of the genus *Munna* are described. The new taxa were named *Munna arcacauda* n.sp., *Munna amphoricauda* n. sp., *Munna jazdzewskii* n. sp., *Munna longipoda* n. sp. and *Munna spicata* n. sp. Some general remarks on the morphology of species of the genus *Munna* and a key for all species from the southern ocean are presented. (Auth.)

B-56053

Barnes, D.K.A., Rothery, P., Clarke, A., **Colonisation and development in encrusting communities from the Antarctic intertidal and sublittoral,** *Journal of experimental marine biology and ecology,* Mar. 1996, 196(1,2), p.251-265, Refs. p.263-265.

A total of 985 rocks with a wide range of surface areas were examined from 6 locations at Signy I. The shallowest site was intertidal and the deepest at 42 m. The probability of coralline algae occurring was found to increase with surface area and depth of rocks, implying decreased levels of turnover or physical disturbance with increasing rock size and depth. Percent area colonized, number of animal phyla, bryozoan species and bryozoan colonies all increased both with rock surface area and depth. Bryozoans and polychaetes were the most abundant encrusting animal groups, although tunicates and sponges were the dominant overgrowth competitors. The faunal elements of the colonizing biota were almost entirely confined to the undersurfaces of rocks whereas algae dominated upper surfaces. In most bryozoan species the proportion of colonies occurring on the upper surfaces of rocks increased with depth to 34 m and then decreased at 42 m where silt deposition apparently became a major influence. (Auth. mod.)

B-56054

Barnes, D.K.A., Rothery, P., **Competition in encrusting Antarctic bryozoan assemblages: outcome, influences and implications,** *Journal of experimental marine biology and ecology,* Mar. 1996, 196(1,2), p.267-284, Refs. p.281-284.

Over 4000 bryozoan-bryozoan interactions were recorded from a total of 985 rocks from 6 locations at Signy I. The majority of these interactions were interspecific meetings. The identity of the competitive species was a major influence on the outcome of encounters, whereas depth and surface area of rocks had little significant influence. The assemblage of bryozoans could be ranked into a clear hierarchy with a competitively dominant species. Zooidal height and colony growth morphology were found to be important factors in overall overgrowth rank. Few interspecific encounters resulted in indeterminate outcomes, but a tied outcome was found to be most likely between competitors of similar overgrowth rank. In contrast, intraspecific meetings mostly resulted in tied outcomes. Species with a higher proportion of colonies on the upper surfaces of rocks were found to have a lower incidence of tied outcomes. One explanation may be the potentially more successful larval dispersal on upper rock surfaces in higher water flow, and the resulting decreased likelihood of neighbors being related. Several incidences of homosyndrome were also observed in three bryozoan species. (Auth.)

B-56055

Prirodina, V.P., Ozouf-Costaz, C., **Description of karyotypes of species of *Harpagifer* (Harpagiferidae, Notothenioidei) from the South Orkney Islands and Macquarie Island,** *Journal of ichthyology,* 1995 (Pub. Aug. 1996), 35(9), p.341-344, Translated from Voprosy ikhtiologii. 9 refs.

The family of plunderfishes (Harpagiferidae) is represented by one monotypic genus, *Harpagifer.* At present, it comprises 7 species; *H. bispinis, H. palliolatus, H. spinosus, H. kerguelensis, H. antarcticus, H. georgianus,* and *H. marionensis.* These small benthic fishes that feed on small crustaceans and are common on the littoral of all subantarctic islands. This article is based on karyotype material for 2 species of harpagiferids collected independently by the authors in different years and in different parts of the southern ocean. The results of the investigation made it possible to describe the karyotypes of *H. antarcticus* from the South Orkney Is. and *Harpagifer* sp. from Macquarie I.

B-56056

Prirodina, V.P., **Chromosomal complements of *Artedidraco mirus* and *Pogonophryne dolichobranchiata* (Artedidraconidae, Notothenioidei) from the Scotia Sea,** *Journal of ichthyology,* 1995 (Pub. Aug. 1996), 35(9), p.395-399, Translated from Voprosy ikhtiologii. 11 refs.

This study on the karyology of species of the family Artedidraconidae is a continuation of research on the karyotypes of the suborder Notothenioidei. The karyotypes of six species and two genera have been described for family Artedidraconidae from the Weddell Sea; this study describes the karyotypes and comparative karyology of two additional species, *Artedicraco mirus* and *Pogonophryne dolichobranchiata,* from western antarctic waters. The specimens were collected on the 20th cruise of the RTMA *Evrika* (AtlantNIRO) in 1986-87 in the Scotia Sea.

B-56057

Weber, K., Goerke, H., **Organochlorine compounds in fish off the Antarctic Peninsula,** *Chemosphere,* Aug. 1996, 33(3), p.377-392, Refs. p.390-392.

Various antarctic fish species, particularly *Chaenocephalus aceratus, Champsocephalus gunnari* and *Gobionotothen gibberifrons,* from 1987 and 1991 were analyzed for 10 nonpolar xenobiotic compounds. Concentrations expressed on the basis of extractable organic matter (EOM) were nearly identical in liver and adipose tissue. They were also independent of fish weight. Concentrations of HCB, which were as high as in *Limanda limanda* of the North Sea (20 ng/g EOM), are interpreted as results of cold condensation, p,p'-DDE, trans-nonachlor and PCB congeners, 153, 138, 180 ranged one to two orders of magnitude lower than in North Sea fish. In addition, nonachlor III, octachlorobornane and mirex were roughly quantified. A residual compound comparable in concentration to octachlorobornane and not yet described in the literature was tentatively identified. From chromatographic and mass spectrometric data the elemental composition $C_{10}H_3OCl_7$ was derived. p,p'-DDE and the three PCB congeners increased in Antarctica between 1987 and 1991 due to global redistribution. (Auth.)

B-56088

Hansson, L.A., Dartnall, H.J.G., Ellis-Evans, J.C., MacAlister, H., Tranvik, L.J., **Variation in physical, chemical and biological components in the subantarctic lakes of South Georgia,** *Ecography,* Dec. 1996, 19(4), p.393-403, 27 refs.

Physical, chemical and biological variables were quantified in 19 subantarctic lakes (South Georgia) as a prelude to comparing these pristine systems with temperate lakes and to improve the knowledge of spatial and temporal variation in water chemistry and abundances of organisms. Lakes close to the sea had higher phosphorus concentrations, contained higher abundances of most organisms, and had higher number of invertebrate species than lakes situated further from the sea. Differences were attributed to higher nutrient input from marine organisms. Since the lakes of South Georgia lack fish, the pelagic invertebrate fauna is dominated by herbivorous macrozooplankton. Rotifers are rare in the open water and are restricted to the vegetation (mainly mosses) in shallow areas and to the sediment surface. Generally, the algal abundance at the sediment surface is high in subantarctic lakes, indicating that the main part of the primary production is provided by benthic algae. (Auth. mod.)

B-56090

Rodhouse, P.G., Nigmatullin, C.M., **Role as consumers,** *Royal Society of London. Philosophical transactions. Series B. Biological sciences,* Aug. 29, 1996, 351(1343), p.1003-1022, Refs. p.1018-1022.

Cephalopods are voracious, versatile predators. They generally have a short life span and a single spawning event followed by death. Populations are subject to dramatic fluctuations and their impact on prey populations is equally variable. The prehensile arms and tentacles of cephalopods, coupled with a highly evolved sensory system, allow them to occupy a broad trophic niche and migrations enable populations to exploit the temporal and spatial variability of production systems and populations of prey. There is increasing evidence that myctophid fishes are an important food resource for oceanic squid. The diet and stock size of some commercially exploited squid populations is sufficiently well known to quantify the impact of a single generation on the prey community. Where there is predation on commercial stocks of fish and crustaceans, the effect of cephalopod feeding on recruitment may be significant. Cephalopods are trophic opportunists in marine food webs from polar to equatorial seas. (Auth. mod.)

B-56091

Croxall, J.P., Prince, P.A., **Cephalopods as prey. I. Seabirds,** *Royal Society of London. Philosophical transactions. Series B. Biological sciences,* Aug. 29, 1996, 351(1343), p.1023-1043, Refs. p.1040-1043.

The authors review quantitative studies of the cephalopod diet of seabirds, with details of all species forming more than 5% by numbers or mass of seabird diets. Although squid are widespread as food for marine birds, only for some albatross and petrel species are they consistently as important as fish or crustaceans. Nevertheless, several penguins, auks and terns take significant quantities of squid at some sites and seasons. Most of the detailed studies have been on temperate and polar seabirds in the Southern Hemisphere. How seabirds catch squid is reviewed, covering the topics of scavenging and live capture and association with cetaceans. In general, seabirds have much smaller known and potential impact on squid stocks than do marine mammals. However, seabirds are probably the best samplers of squid populations currently available and can provide valuable data for the identification of potential and management of existing, commercial fisheries. Future research needs, especially for studying the dynamics of squid-seabird interactions, are reviewed. (Auth. mod.)

B-56092

Klages, N.T.W., **Cephalopods as prey. II. Seals,** *Royal Society of London. Philosophical transactions. Series B. Biological sciences,* Aug. 29, 1996, 351(1343), p.1045-1053, Refs. p.1050-1052.

For 31 of the 33 extant species of pinnipeds it is either known or suspected that they include cephalopods in their diet. The two exceptions are the Baikal seal and the Caspian seal, which inhabit freshwater where cephalopods do not occur. The available evidence indicates that no species of seal specializes entirely on cephalopods and only few regularly eat appreciable quantities of this prey, although for several they appear to be seasonally important prey. For most pinnipeds only rudimentary prey identifications have been published. The most common taxa of cephalopds reported to be consumed by seals are members of the neritic Loliginidae, the oceanic Ommastrephidae, Onychoteuthidae and Gonatidae, as well as benthic octopods. (Auth. mod.)

B-56093

Clarke, M.R., **Cephalopods as prey. III. Cetaceans,** *Royal Society of London. Philosophical transactions. Series B. Biological sciences,* Aug. 29, 1996, 351(1343), p.1053-1065, Refs. p.1063-1065.

Over 80% of odontocete species and two baleen whale species include cephalopods in their diet regularly. In 28 odontocetes they comprise the main food. Predominantly cephalopod-eating species are found in the Physeteridae, Ziphiidae, Phocaenidae and Delphinidae. By far the most important of the 28 families of cephalopods represented in the diet of cetaceans are the oceanic Ommastrephidae, Histioteuthidae and the Cranchiidae, with the neritic Loliginidae assuming most importance on the continental shelves. Onychoteuthidae and Gonatidae assume greater importance in polar regions and the North Pacific. Broad estimates show that the biomass of oceanic cephalopods consumed annually by the largest odontocete, *Physeter catodon,* may be over twice the biomass of fish caught by man. Regional estimates show that consumption by cetaceans of little known cephalopod species may greatly exceed the local catches of commercial fish. (Auth. mod.)

B-56094

Smale, M.J., **Cephalopods as prey. IV. Fishes,** *Royal Society of London. Philosophical transactions. Series B. Biological sciences,* Aug. 29, 1996, 351(1343), p.1067-1081, Refs. p.1076-1081.

Cephalopods are rarely taken by benthic antarctic fishes but they are important prey of some pelagic fishes in the Arctic. Abundance and size of potential prey is critical, and the behavior of both predator and potential prey is decisive, in prey choice. Factors such as prey switching with growth, between areas and at different times, have major influences on the diets of predators. Cephalopods are important components of most marine food webs and, furthermore, may play an indirect role in facilitating prey capture to secondary predators, and in providing rejecta to benthic scavengers. (Auth. mod.)

B-56095

Clarke, M.R., **Role of cephalopods in the world's oceans: general conclusions and the future,** *Royal Society of London. Philosophical transactions. Series B. Biological sciences,* Aug. 29, 1996, 351(1343), p.1105-1112, 6 refs.

In the Antarctic, the annual consumption of odontocetes is estimated at 14.4 mt and the squid taken by beaked whales alone are calculated to eat about 24 mt of krill, approaching the 33 mt of krill consumed by penguins. If the muscular cephalopods were removed by fisheries and then followed by removal of buoyant squids, impact on top predator populations would be greatly increased; over large areas of the deep oceans, populations of small midwater fish like myctophids would increase, and populations of the top predators, particularly cetaceans and seabirds globally and seals and fishes regionally, would decrease. Trophic links among the fish, cephalopods and vertebrate predators should be studied within representative areas. A start has been made for the Antarctic.

B-56096

Everson, I., De la Mare, W.K., **Some thoughts on precautionary measures for the krill fishery,** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.1-11, With French, Russian and Spanish summaries. 13 refs.

The concept of precautionary measures for krill is discussed. A precautionary catch limit, based on the potential yield model developed by the CCAMLR Scientific Committee's Working Group on Krill (WG-Krill) is discussed and it is concluded that such a method is appropriate in setting an overall precautionary catch limit in large areas, such as Statistical Area 48, but the approach requires considerable refinement to provide a sufficient safeguard for land-based predators. A new approach is described which takes account of the requirements of land-based predators. Implementation of the approach is discussed and the question of how the method relates to the current CCAMLR Ecosystem Monitoring Program (CEMP) is considered. (Auth.)

B-56097

Fedulov, P.P., Murphy, E., Shul'govskiĭ, K.E., **Environment-krill relations in the South Georgia marine ecosystem,** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.13-30, With French, Russian and Spanish summaries. Refs. p.26-28.

In this study, time series of krill abundance (CPUE) indices were derived from Soviet fishing operations in the northeastern Scotia Sea around South Georgia for the period from 1974 to 1992. These indices were examined in relation to the variation in the physical environment. There are links between the ice, ocean and atmospheric components of the system, and there are also correlations with CPUE data. The CPUE index generally agrees with other data which give direct or indirect indications of krill availability, suggesting it can be a useful index for some regions. Associations with ice-edge position and atmospheric components were only expressed strongly in years of extreme conditions. The correlation with water temperature was more consistent, supporting suggestions that the variability in krill abundance around South Georgia is strongly influenced by the oceanographic regime of the Scotia Sea. (Auth. mod.)

B-56098

Constable, A.J., De la Mare, W.K., **Generalised model for evaluating yield and the long-term status of fish stocks under conditions of uncertainty,** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.31-54, With French, Russian and Spanish summaries. 12 refs.

This paper presents a general fish stock projection model for assessing the long-term annual yield which satisfies objectives for the maintenance of the spawning stock biomass in accordance with CCAMLR criteria. The model can also be used to evaluate stochastic stock trajectories under a specified catch regime. The model uses an adaptive Runge-Kutta algorithm to calculate stock trajectories and catch rates over a specified simulation period. The procedure numerically integrates a set of differential equations which incorporate functions that specify growth, mortality, age-dependent selectivity and seasonal patterns in fishing mortality. Results from the model are compared with existing analyses from the krill yield model. The model can include a known catch history and thus allow assessments of yield to be made for existing fisheries. An example is presented for the Patagonian toothfish, *Dissostichus eleginoides,* around South Georgia I. (Auth. mod.)

B-56099

Parkes, G., Moreno, C.A., Pilling, G., Young, Z., **Use of the Leslie stock depletion model for the assessment of local abundance of Patagonian toothfish *(Dissostichus eleginoides)*,** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.55-77, With French, Russian and Spanish summaries. 14 refs.

The Leslie depletion model has been used to examine local patterns in catch per unit effort (CPUE) in the longline fisheries for Patagonian toothfish *(Dissostichus eleginoides)* around South Georgia and the Pacific coast of Chile. This paper presents a re-working and synthesis of previous analyses to examine whether declines in CPUE can be modelled using a linear regression of catch per hook against cumulative catch, when single vessels operate in localized areas for periods of at least three days. The results suggest that there is greater potential for application of the model in some areas than in others, but in general there is no sufficiently consistent signal in the data for the depletion model to be used to estimate local abundance. A number of possible explanations are considered, including movements of fish, the behavior of fishermen, variable catchability and insufficiently high catch to cause local depletion. Suggestions are made for further work. (Auth.)

B-56105

Watanuki, Y., Suzuki, T., Fukuchi, M., **Report on the phytoplankton pigments measured during the JARE-30 cruise to Syowa Station, Antarctica, November 1988 to March 1989,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.214, 181p., 4 refs.

This is a report on the surface phytoplankton pigments measured on board the icebreaker *Shirase* during the JARE-30 cruise to and from Showa Station from Nov. 1988 to Mar. 1989. Concentrations of chlorophyll *a* in the surface water along the cruise track of phytoplankton pigments were measured in two series: geographical variations of chlorophyll *a* in the surface water along the cruise track, and vertical profiles in antarctic waters. Tabulated data are presented.

B-56106

Konno, T., Suzuki, T., Fukuchi, M., **Report on the phytoplankton pigments measured during the JARE-31 cruise to Syowa Station, Antarctica, November 1989 to March 1990,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.215, 70p., 4 refs.

This is a report on the phytoplankton pigments measured on board the icebreaker *Shirase* during the JARE-31 cruise to and from Showa Station from Nov. 1989 to Mar. 1990. Concentration of phytoplankton pigments were measured in two series: geographical variations of chlorophyll *a* in the surface water along the cruise track, and vertical profiles of phytoplankton stocks in antarctic waters. Tabulated data are presented.

B-56107

Kuramochi, T., Suzuki, T., Fukuchi, M., **Report on the phytoplankton pigments measured during the JARE-32 cruise to Syowa Station, Antarctica, November 1990 to March 1991,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.216, 184p., 4 refs.

This is a report on the phytoplankton pigments measured on board the icebreaker *Shirase* during the JARE-32 cruise to and from Showa Station from Nov. 1990 to Mar. 1991. Concentration of phytoplankton pigments were measured in two series: geographical variations of chlorophyll *a* in the surface water along the cruise track, and vertical profiles of phytoplankton stocks in antarctic waters. Tabulated data are presented.

B-56108

Odate, T., Harada, N., Suzuki, T., Fukuchi, M., **Report on the surface phytoplankton pigments measured during the JARE-33 cruise to Syowa Station, Antarctica, November 1991 to March 1992,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.217, 101p., 5 refs.

This is a report on geographical variations of chlorophyll *a* measured on board the icebreaker *Shirase* during the JARE-33 cruise to Showa Station from Nov. 1991 to Mar. 1992. Chlorophyll *a* concentration in the surface water was measured with a continuous monitoring system. The data, obtained with a Turner Designs model 1000R fluorometer and calibrated with the data measured manually using the N,N-dimethylformamide method, are presented in tables. A log-linear correlation between the results obtained by both methods was observed over a wide range of chlorophyll *a* concentrations.

B-56109

Ishii, M., Suzuki, T., Fukuchi, M., **Report on the surface phytoplankton pigments measured during the JARE-34 cruise to Syowa Station, Antarctica, November 1992 to March 1993,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.218, 206p., 4 refs.

This is a report on geographical variations of chlorophyll *a* measured on board the icebreaker *Shirase* during the JARE-34 cruise to Showa Station from Nov. 1992 to Mar. 1993. Chlorophyll *a* concentration in the surface water was measured with a continuous monitoring system. The data, obtained with a Turner Designs model 1000R fluorometer and calibrated with the data measured manually using the N,N-dimethylformamide method, are presented in tables. A log-linear correlation between the results obtained by both methods was observed over a wide range of chlorophyll concentrations.

B-56110

Kawachi, M., Suzuki, T., Fukuchi, M., **Report on the phytoplankton pigments measured during the JARE-35 cruise to Syowa Station, Antarctica, November 1993 to March 1994,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.219, 183p., 3 refs.

This is a report on the phytoplankton pigments measured on board the icebreaker *Shirase* during the JARE-35 cruise to and from Showa Station from Nov. 1993 to Mar. 1994. Concentration of phytoplankton pigments were measured in two series: geographical variations of chlorophyll *a* in the surface water along the course of the cruise, and vertical profiles of phytoplankton stocks in antarctic waters. Tabulated data are presented.

B-56111

Gliesche, C.G., Jendrach, M., Peissl, K., Siebert, J., Hirsch, P., **Characterization and transformation of plasmid pAA-1 found**

in an antarctic cryptoendolithic bacterium, *Canadian journal of microbiology,* June 1996, 42(6), p.571-576, With French summary. Refs. p.575-576.

Sixty-three bacterial isolates from antarctic sandstone samples were screened for the presence of plasmid DNA. Twenty-seven percent of all the isolates (mainly Gram-positives) harbored one or more plasmids of low molecular mass (1.1-16.3 kb). Strain AA-341 contained plasmid pAA-1 (2.9 kb), as demonstrated by agarose gel electrophoresis and restriction endonuclease digests. This plasmid conferred resistance to chromium and ampicillin. It was not conjugative, but it could be transferred by electroporation to chromium- and ampicillin-sensitive strains AA-330, AA-338, and *E. coli* HB101. A restriction map of pAA-1 was constructed with *Hind*III, *Sal*I, *Sca*I, *Ava*II, *Eco*RI, *Pvu*II, *Bam*HI, and *Dra*I. Electrotransfer of this plasmid from *E. coli* HB101 (pAA-1) to strain AA-330 was demonstrated. By natural genetic transformation, plasmid pAA-1 could be transferred into the sensitive strain AA-334, which thereby became resistant to chromium and ampicillin. The importance of such processes for the colonization of stressed environments is discussed. (Auth.)

B-56112

Hobson, R.P., Martin, A.R., **Behaviour and dive times of Arnoux's beaked whales, *Berardius arnuxii*, at narrow leads in fast ice,** *Canadian journal of zoology,* Feb. 1996, 74(2), p.388-393, With French summary. 17 refs.

Groups of the little-known Arnoux's beaked whale, *Berardius arnuxii,* were observed at narrow cracks or leads in sea ice near the Antarctic Peninsula during the summer of 1992-1993. The whales were grey, had a slightly asymmetric blowhole and blow, and were heavily scarred in adulthood. At least 30 animals were uniquely identified using their scars. Despite often cramped conditions at the breathing holes, the whales were always calm and nonaggressive, reacting to the circumstances with surfacing and submerging behavior involving little horizontal movement. Seventy dive durations by 17 identified adults were recorded, with a mode of 35-65 min and a maximum of at least 70 min. Eight periods of respiration varied between 1.2 and 6.8 min, with an average of 9.6 blows/min. These breath-hold characteristics confirm *B. arnuxii* as one of the most accomplished mammalian divers, capable of swimming up to an estimated 7 km between breathing sites in sea ice. Whales moved to and from the observed lead, apparently able to find other breathing sites in what appeared to be unbroken ice. The species seems well adapted to life in ice-covered waters and may be able to exploit food resources inaccessible to other predators in the region. (Auth.)

B-56115

Goldstein, P., Wharton, D., **Synaptonemal complexes of the meiotic parthenogenetic Antarctic nematode *Panagrolaimus davidi*: karyotype analysis and three-dimensional reconstruction of pachytene nuclei,** *Cytobios,* 1996, 85(341), p.81-90, Refs. p.89-90.

This study represents the first complete reconstruction of synaptonemal complexes (SCs) and analysis of the pachytene stage of meiosis prophase I in the genus *Panagrolaimus.* In the free-living meiotic parthenogenetic antarctic nematode *P. davidi,* pachytene nuclei had an average nuclear volume of 40 μm^3. Seven synaptonemal complexes were present (n=7) and the average total length was 65.1 μm. The SCs were attached to the NE at only one end. The nucleolar organizer region was restricted to a central position on the SC. The unstriated central element consisted of two linear components and lacked transverse filaments. Such a modification of the SC has been seen in only two other organisms; the amphimictic nematode *Heterodera glycines* and the meiotic parthenogenetic nematode *Heterodera betulae.* Recombination nodules were not evident in the pachytene nuclei. There was no apparent interlocking of bivalents. Morphologically distinct sex chromosomes were not observed.

B-56123

Smith, W.O., Jr., Nelson, D.M., DiTullio, G.R., Leventer, A.R., **Temporal and spatial patterns in the Ross Sea: phytoplankton biomass, elemental composition, productivity and growth rates,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,455-18,465, Refs. p.18,463-18,465.

The temporal and spatial patterns of phytoplankton biomass, productivity, and particulate matter composition in the Ross Sea were assessed during cruises in Jan. 1990 and Feb. 1992. Biomass and primary productivity in the southern Ross Sea were greatest during mid-Jan. A distinct south-north transition also was observed both in productivity and phytoplankton biomass, with the lowest values occurring in the northern Ross Sea. East-west gradients in phytoplankton biomass and composition occurred within the southern Ross Sea. The areal productivity of the Ross Sea is among the highest found in the entire Antarctic. Marked seasonality in the region provides an environment in which net growth rates, although slow, are maximized through low loss rates and which allows biomass to accumulate in the surface layer. Furthermore, the temporal variations are quantitatively similar to the observed spatial variations. Therefore the dominant determinant of phytoplankton biomass and productivity at any one point on the Ross Sea continental shelf is the stage of the seasonal growth cycle. (Auth. mod.)

B-56124

DiTullio, G.R., Smith, W.O., Jr., **Spatial patterns in phytoplankton biomass and pigment distributions in the Ross Sea,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,467-18,477, 57 refs.

The distribution of phytoplankton biomass and pigments was determined in the Ross Sea during late austral summer 1992. Large gradients in biomass were noted both in the east-west and north-south direction, with maximum particulate matter concentrations occurring in the southwest portion of the Ross Sea. Two xanthophyll pigments dominated the profiles. Diatom-dominated regions had greater fluxes of phaeophorbides, suggesting that metazoans were the most important grazers at these locations. In contrast, the phaeophytin/total phaeopigment ratio was highest in waters dominated by *Phaeocystis antarctica.* The distribution of phytoplankton biomass and pigments revealed a spatially variable distribution of taxa, one which clearly has important consequences to food-web dynamics, biogeochemical cycles, and vertical flux patterns in the Ross Sea. (Auth. mod.)

B-56126

Leventer, A.R., Dunbar, R.B., **Factors influencing the distribution of diatoms and other algae in the Ross Sea,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,489-18,500, 63 refs.

Quantitative microscopic analyses of sediment trap samples collected in the Ross Sea between Jan. 1990 and Feb. 1992 reveal striking temporal and spatial differences in algal bloom composition and size. Trap samples from the southewestern Ross Sea were dominated by the diatom *Fragilariopsis curta* (maximum of 92%), a species associated with both sea ice and the retreating ice edge in the Ross Sea. This species was probably seeded by melting congelation ice. Highest flux of diatom valves to both upper and lower traps in the 1991-92 season occurred as a distinct event in mid-Feb. 1991, after which flux decreased by 1 to 3 orders of magnitude. Distinct differences in bloom size and composition between sites may be a function of upper water column structure, differences in the amount of sea ice melting, and the type of sea ice present at the time of ice breakout (congelation versus pack ice). Significantly, spatial differences in diatom assemblages noted above appear to be reflected in seafloor surface sediments, suggesting that downcore diatom data provide an interpretable record of paleoproductivity in the Ross Sea. (Auth. mod.)

B-56129

Kunzmann, K., **Associated fauna of selected sponges (Hexactinellida and Demospongiae) from the Weddell Sea, Antarctica** [Die mit ausgewählten Schwämmen (Hexactinellida und Demospongiae) aus dem Weddellmeer, Antarktis, vergesellschaftete Fauna], *Berichte zur Polarforschung,* 1996, No.210, 93p., In German with English summary. 96 refs.

During Polarstern expedition ANT VII/4 (Epos leg 3) to the eastern and southeastern part of the Weddell Sea, individuals of several dominant species of the sponge classes Hexactinellida and Demospongiae were collected. In total, 42 individuals of four hexactinellid species and 32 individuals of nine demosponge species were investigated with respect to associated in- and epifauna. Of the dominant hexactinellid species *Rossella antarctica* and *Rossella racovitzae,* 150 and 770 individuals, respectively were examined for associated fauna living in their central cavity. More than 3000 individuals belonging to more than 100 species were found in association with sponges. Polychaetes dominate in terms of abundance as well as in number of species. Stomach and intestine investigations of selected gastropod and amphipod species, collected from hexactinellids and demosponges, clearly show that some species are feeding on sponges. Length-frequency distributions of dominant amphipod species associated with the two sponge classes have shown that different age and molting sizes co-inhabit in the sponges. Based on the results of this study and already published papers, it is possible to differentiate the relationships between hosts and guests of the dominant associated species and fauna groups. Major emphasis is placed on symphorism, entoekie and parasitism as main types of association. (Auth. mod.)

B-56131

Metz, C., **Life strategies of dominant antarctic Oithonidae (Cyclopoida, Copepoda) and Oncaeidae (Poecilostomatoida, Copepoda) in the Bellingshausen Sea** [Lebensstrategien dominanter antarktischer Oithonidae (Cyclopoida, Copepoda) und Oncaeidae (Poecilostomatoida, Copepoda) im Bellingshausenmeer], *Berichte zur Polarforschung,* 1996, No.207, 123p., In German with English summary. 114 refs.

The present study deals with the life cycle strategies of the dominant antarctic oithonids and oncaeids. It focuses on their distribution and abundance, their feeding and their life cycles and reproduction strategies. The material was collected during two expeditions to the Bellingshausen Sea in Feb. 1994 and Apr. 1995 with RV *Polarstern.* Depth stratified samples were taken on transects from the open ocean onto the shelf with the Multinet (mesh size 55 μm) from 1000 m depth or the sea bed to the surface. Additionally, the British Antarctic Survey provided samples taken on a transect in the same area with a WP-2 net in Nov.-Dec. 1992 in the upper 100 m or 250 m, respectively. The samples were analyzed with regard to abundance (n/m^3), stock of individuals (n/m^2), biomass of the population, population structure and reproduction of the dominant oithonids and oncaeids. Details of these activities are provided. (Auth. mod.)

B-56137

Warén, A., Hain, S., **Description of Zerotulidae fam. nov. (Littorinoidea), with comments on an Antarctic littorinid gastropod,** *Veliger,* Oct. 1, 1996, 39(4), p.277-334, Refs. p.333-334.

Zerotulidae fam. nov. is described and placed in the Littorinoidea. The family includes the genera *Zerotula* Finlay, 1926 (formerly in Architectonicidae); *Frovina* Thiele, 1912 (synonymized with *Prolacuna* Thiele, 1913, both formerly in Naticidae); *Trilirata* Warén & Hain, gen. nov. (type species *Prolacuna trilirata* Thiele, 1912, (Antarctic)); and *Dickdellia* Warén & Hain, gen. nov. (type species *Laevilitorina (Corneolitorina) labioflecta* Dell, 1991 (Antarctic), bathyal). The following new species are described: *Frovina angularis* Warén & Hain, *Zerotula incognita* Warén & Hain, *Z. stellapolaris* Warén & Hain (Antarctic), *Z. coronata* Warén & Hain, *Trilirata sexcarinata* Warén & Hain (Antarctic), *T. triregis* Warén & Hain and *T. herosae* Warén & Hain. The anatomy is described for *Frovina soror* Thiele, 1912, *F. indecora* (Thiele, 1912), *Zerotula stellapolaris, Trilirata macmurdensis* (Hedley, 1911), *T. sexcarinata,* and *D. labioflecta. Antitrichotropis wandelensis* (Lamy, 1906) (formerly in Capulidae, Neotaenioglossa) is transferred to Laevilitorininae (Littorinidae), based on examination of radula and external morphology of the headfoot. It is classified in *Laevilitorina,* subgenus *Pellilacunella.* (Auth. mod.)

B-56180

Oeland, G., Lanting, F., **Emperors of the ice,** *National Geographic,* Mar. 1996, 189(3), p.52-71.

This article consists mainly of photographs of emperor penguins, *Aptenodytes forsteri,* their chicks, their colonies and their environment. The text describes the penguins' behavior during the breeding season, the hatching of eggs at -40° temperature, their feeding habits and the coping with blizzard, darkness and months of killing cold.

B-56183

Archer, S.D., Leakey, R.J.G., Burkill, P.H., Sleigh, M.A., **Microbial dynamics in coastal waters of East Antarctica: herbivory by heterotrophic dinoflagellates,** *Marine ecology progress series,* Aug. 29, 1996, 139(1-3), p.239-255, Refs. p.253-255.

Heterotrophic dinoflagellates and their herbivory were quantified at a coastal site in East Antarctica, the O'Gorman Rocks. The study period, Jan. 14 to Feb. 11, 1994, coincided with the growth and decline of a diatom-dominated phytoplankton bloom. Nine taxa of heterotrophic dinoflagellates, including 2 naked and 7 armoured forms, were identified and selected for the determination of standing stock and grazing rates. All 9 taxa selected for grazing rate measurements showed an increase in abundance and biomass during the phytoplankton bloom. The total ingestion rate of the 9 taxa was 29.7 ng chl *a*/l/h on Jan. 31, of which 92% was consumed by the 3 most abundant taxa, *Gyrodinium* sp.2, *Gyrodinium* sp.2 and *Diplopeltopsis* spp. This activity represented 6.7% of the water column cleared, 4.8% of autotrophic biomass and 25% of daily primary production ingested per day. The estimates of grazing impact on phytoplankton biomass and production illustrate that heterotrophic dinoflagellates play an important part in the biotic control of phytoplankton production and therefore of carbon flux through the food web of coastal waters of East Antarctica. (Auth. mod.)

B-56184

Rodhouse, P.G., et al, **Cephalopods and mesoscale oceanography at the Antarctic Polar Front: satellite tracked predators locate pelagic trophic interactions,** *Marine ecology progress series,* June 6, 1996, 136(1-3), p.37-50, Refs. p.49-50.

Predator data and exploratory fishing in the Scotia Sea have revealed the presence of cephalopod stocks in the Antarctic Polar Frontal Zone (PFZ). This is a vast, remote region where large epipelagic cephalopods aggregate into highly mobile schools making them difficult to locate and sample. The authors used satellite tagged predators and shipboard acoustics for coarse and fine scale location of cephalopod concentrations, and sampled them with commercial and scientific nets to determine the relationship between cephalopod distribution and mesoscale oceanographic features at the PFZ. Satellite tags were attached to 9 grey-headed albatrosses *Diomedea chryosostoma,* breeding at Bird I., to monitor foraging at sea in Jan.-Mar. 1994. A foraging area at the PFZ, north of South Georgia, was located, an acoustic survey undertaken and a fixed station established where acoustic targets were found. The pelagic trawl sampled a cephalopod community that closely resembled that exploited by *D. chrysostoma.* The largest and most conspicuous species was the ommastrephid squid *Martialia hyadesi* which is the most important cephalopod prey species. Net-sampled *M. hyadesi* had been feeding on crustaceans and mesopelagic fish. (Auth. mod.)

B-56185

Davenport, J., Pugh, P.J.A., McKechnie, J., **Mixed fractals and anisotropy in subantarctic marine macroalgae from South Georgia: implications for epifaunal biomass and abundance,** *Marine ecology progress series,* June 6, 1996, 136(1-3), p.245-255, 28 refs.

Fractal dimensions (D) of image perimeters of 4 macroalgae *(Macrocystis pyrifera, Desmarestia menziesii, Schizoseris condensata, Palmaria georgica)* collected at South Georgia were established over a wide scale range. For 3 species *(M. pyrifera, S. condensata, P. georgica)* cross-frond D was also estimated. At large scale all species showed complex perimeters (D 1.26 to 1.83), but showed reduced complexity (low D) at small scale, and so have mixed fractal characteristics. Cross-frond D was low in the 3 species studied, indicating anisotropy, and was markedly low in *P. georgica* which has extensive, smooth, flat fronds. Epifaunal community analysis demonstrated that epifaunal abundance and biomass were related more to the scale at which complexity occurs than degree of complexity itself. *S. condensata* and *D. menziesii* (particularly complex, high D) show high epifaunal abundance and biomass and a predominance of large animals; *M. pyrifera* and *P. georgica* (simpler, lower D) have low abundances and biomasses and the epifauna is dominated by small animals. *M. pyrifera* is fairly complex (D ca. 1.3) at scales above 50 mm; its complexity will impinge on fish, birds and mammals, not epifauna. *M. pyrifera* beds have a perimeter D (ca. 1.4) similar to those of convoluted coastlines. (Auth.)

B-56186

Hill, H.J., Trathan, P.N., Croxall, J.P., Watkins, J.L., **Comparison of Antarctic krill *Euphausia superba* caught by nets and taken by macaroni penguins *Eudyptes chrysolophus*: evidence for**

selection?, *Marine ecology progress series,* Sep. 12, 1996, 140(1-3), p.1-11, Refs. p.10-11.

Using stomach lavage samples from macaroni penguins *Eudyptes chrysolophus* Brandt breeding at Bird I. and concurrent net samples caught within the penguin foraging range, the authors examined the potential selection of different length and maturity stages of krill, *Euphausia superba* Dana. Using Monte Carlo randomized simulation techniques, they also determined the probability of obtaining length-frequency distributions of krill different from that obtained in the net samples. The krill taken by the macaroni penguins differed significantly from those caught in the nets. Small krill (28 to 38 mm) were absent from the stomach samplers, whereas large krill (58 to 62 mm) were more abundant. Comparison of krill maturity stages showed that krill taken by macaroni penguins contained 3 times as many female as male krill, whereas krill caught in nets contained nearly equal proportions. The differences in size and maturity of krill taken by penguins are discussed in terms of aggregated random sampling, prey selection by predators, and evasion by krill of predators and nets. It is concluded that the differences are unlikely to be accounted for simply by sampling anomalies; the differences are more likely to relate to penguins selecting larger, nutritionally superior krill, but might also reflect differential escape responses of particular classes of krill when evading penguins or nets. (Auth. mod.)

B-56187

Reid, K., Trathan, P.N., Croxall, J.P., Hill, H.J., **Krill caught by predators and nets: differences between species and techniques,** *Marine ecology progress series,* Sep. 12, 1996, 140(1-3), p.13-20, Refs. p.19-20.

Samples of krill collected from 6 seabird species and antarctic fur seal during Feb. 1986 at South Georgia were compared to krill from scientific nets fished in the area at the same time. The length-frequency distribution of krill was broadly similar between predators and nets although the krill taken by diving species formed a homogeneous group which showed significant differences from krill taken by other predators and by nets. There were significant differences in the maturity/sex stage composition between nets and predators; in particular all predator species showed a consistent sex bias towards female krill. Similarities in the krill taken by macaroni (offshore feeding) and gentoo (inshore feeding) penguins and differences between krill taken by penguins and albatrosses suggest that foraging techniques were more important than foraging location in influencing the type of krill in predator diets. Overall, adult, sexually active female krill, forming 40% by number of the local krill population, may comprise 60 to 70% by number and 75 to 88% by mass of the krill taken by their main seabird and seal predators at South Georgia at the time of peak local demand in Feb. (Auth. mod.)

B-56188

Ward, P., Shreeve, R.S., Cripps, G.C., Trathan, P.N., **Mesoscale distribution and population dynamics of *Rhincalanus gigas* and *Calanus simillimus* in the Antarctic Polar Open Ocean and Polar Frontal Zone during summer,** *Marine ecology progress series,* Sep. 12, 1996, 140(1-3), p.21-32, Refs. p.30-32.

Two dominant antarctic copepod species, *Rhincalanus gigas* and *Calanus simillimus,* were sampled at stations along a 420 km transect running towards South Georgia during early Jan. 1994 and again 1 mo later. The transect spanned the Polar Frontal Zone (PFZ), crossing the Polar Front (PF) into antarctic surface waters. In Jan., diatom blooms were present immediately south of the PF and at open ocean stations further south, where unusually high total pigment levels were recorded. In early Jan., north of the PF, *R. gigas* had not yet commenced spawning although recruitment had begun to the south. Early stages of *C. simillimus* copepodites were, however, present at all stations sampled. South of the PF both gonad maturity and lipid levels in *R. gigas* showed a clear positive relationship with the elevated pigment concentrations. *C. simillimus* females, on the other hand, were ripe at the majority of stations sampled regardless of pigment levels. A month later postbloom conditions were present over the greater part of the transect and the summer generation of both species was present at all stations. A proportion of the summer generation of *C. simillimus* had already reached adulthood and their gonads were maturing. The populations of both species were older in PFZ waters, and mean population age showed a strong correlation with water temperature. (Auth. mod.)

B-56190

Wakabara, Y., Tararam, A.S., Miyagi, V.K., **Amphipod fauna of the West Antarctic region (South Shetland Islands and Bransfield Strait),** *Polskie archiwum hydrobiologii. Polish archives of hydrobiology,* 1995, 42(4), p.347-365, With French summary. 10 refs.

Ninety-one gammaridean species were identified from West Antarctica and, among them, 15 species were widely distributed in the area. Conspicuously ornamented gammaridean species were generally absent in fish and bird stomach contents and it is suggested that predators avoid them as prey. Species were divided into four groups according to their depth distrbution, but the data presently available do not allow to reach a complete and accurate distributional pattern of the species in the region. (Auth.)

B-56191

Jażdżewski, K., Węsławski, J.M., De Broyer, C., **Comparison of the amphipod faunal diversity in two polar fjords: Admiralty Bay, King George Island (Antarctic) and Hornsund, Spitsbergen (Arctic),** *Polskie archiwum hydrobiologii. Polish archives of hydrobiology,* 1995, 42(4), p.367-384, Refs. p.382-384.

The amphipod faunas of two polar fjords—one in the Antarctic and the other in the Arctic—were studied in detail. A comparison of the taxonomical and distributional data hitherto obtained clearly shows that the amphipod fauna of the antarctic fjord appears to be considerably richer in taxa at all levels. In Admiralty Bay, 106 species, 67 genera, 31 familes have been recorded with Eusiridae s.l. as the family, or group of families, with most species (23). In Hornsund, 58 species, 41 genera, and 22 families are known, with Lysianassidae s.l. represented by 10 species as the richest family. Only 5 genera (one pelagic) are shared by the two localities. The longer history of isolated evolution and the higher heterogeneity of habitats are invoked as probable main causes to explain the higher antarctic biodiversity. (Auth.)

B-56192

Opaliński, K.W., Siciński, J., **Oxygen consumption in antarctic tidal zone amphipods,** *Polskie archiwum hydrobiologii. Polish archives of hydrobiology,* 1995, 42(4), p.537-546, Refs. p.545-546.

Measurements of oxygen consumption were made in 3 species of antarctic amphipods, *Eurymera monticulosa, Bovalia gigantea* and *Gondogeneia antarctica,* living in the tidal zone of Admiralty Bay. The metabolic rate of these animals, 118, 100 and 360 mm^3 per gram wet weight per hour, respectively, is higher than the metabolic rate of pelagic and benthic-sublittoral amphipods in the southern ocean. The daily cost of maintenance for tidal zone amphipods amounts to 3.0% of the total energy cumulated in the animal's body, and is more than one and a half times higher than for pelagic amphipods and more than three times higher than for benthic-sublittoral ones. (Auth.)

B-56193

Voronina, N.M., **Euphausiid larvae in the southern part of the Pacific sector of the Antarctic in February to March, 1992,** *Oceanology,* Sep.-Oct. 1995, 35(5), p.660-667, Translated from Okeanologiia. 41 refs.

The material was collected along a latitudinal transect in the middle of the Pacific sector of the Antarctic (67°S) and in the area northeast of the Balleny Is. during Feb. and Mar. 1992. Four water modifications were studied: low latitude (antarctic circumpolar current), high latitude (coastal antarctic current), mixed, and shelf waters. Larvae of two euphausiid species were found: *Euphausia superba* and *Thysanoessa macrura.* The data of the stations show that postlarval development of *T. macrura* can be completed during the first period of growth only in part of the survey region. The quantitative distribution of euphausiids is discussed on the basis of the obtained and published data. No evidence is found for the existence of an independent ecosystem characterized by an abundance of this group and its predominance in the community in the Pacific sector of the Antarctic to the south of the seasonal northern ice boundary. (Auth. mod.)

B-56196

Beddington, J.R., De la Mare, W.K., **Marine mammal-fishery interactions: modelling and the Southern Ocean,** Marine mammals and fisheries. Edited by J.R. Beddington, R.J.H. Beverton and D.M. Lavigne, London, George Allen & Unwin, 1985, p.94-105, Refs. p.104-105.

DLC QL713.2.M35 1985

Marine mammals as predators of antarctic resources are discussed in detail with respect to mathematical models of the southern ocean system.

B-56197

Pascal, M., **Numerical changes in the population of elephant seals *(Mirounga leonina* L) in the Kerguelen Archipelago during the past 30 years,** Marine mammals and fisheries. Edited by J.R. Beddington, R.J.H. Beverton and D.M. Lavigne, London, George Allen & Unwin, 1985, p.170-186, Refs. p.185-186.

DLC QL713.2.M35 1985

Census results from surveys conducted in 1970 (Pascal 1979) and 1977 (Van Aarde 1980) indicated a clear decline in the population of elephant seals frequenting the Kerguelen Archipelago. Between 1958 and 1961, approximately 6000 males were removed from the population by the Societé Industrielle des Abbettoirs Parisiens. Since that time the population has not been exploited. In this paper, techniques are developed to quantify the abundance of the population from census data. The causes of the marked decline in the size of the population are considered.

B-56198

Jouventin, P., Bried, J., Ausilio, E., **Life-history variations of the Lesser Sheathbill *Chionis minor* in contrasting habitats,** *Ibis,* Oct. 1996, 138(4), p.732-741, Refs. p.740-741.

From 1987 until 1995, life-history traits of the Lesser Sheathbill *Chionis minor* in the Kerguelen Archipelago were compared with those at other localities. At Kerguelen I. only, some pairs breed on shores free of penguin and cormorant colonies. Pairs, including nonbreeders, and solitary individuals maintain territories all year-round. Site and mate changes wre not linked, and all divorces were permanent. Fidelity rates were similar in all localities and so were the annual survival rates of adults. The survival rate of immature individuals was highest at Kerguelen I., where sheathbills laid smaller clutches, produced fewer fledglings and had lower breeding success than in the other subantarctic islands. Kerguelen sheathbills devoted less time to food acquisition than those on Marion I., being exceptionally kleptoparasitic, and spent a smaller part of their foraging time exploiting seabird colonies. Their diet was mainly algae. The differences on Kerguelen I., as compared with other localities, were caused by the presence of an extensive intertidal zone on the former, which reduced competition, making many more sites suitable and the environment more predictable. (Auth. mod.)

B-56199

Moreno, J., Carrascal, L.M., Sanz, J.J., **Parent-offspring interactions and feeding chases in the Chinstrap penguin *Pygoscelis antarctica*,** *Bird Behavior,* 1996, 11(1), p.31-34, 12 refs.

Feeding interactions between parents and chicks in pygoscelid penguins frequently lead to "chases." In a field experiment with Chinstrap penguins *(Pygoscelis antarctica)* on Deception I., the authors showed that chases are almost nonexistent when a parent is met by only one of their chicks (the other was temporarily removed). Also, chasing intensity in the two-chick situation decreased after chick separation, whereas the rate of feedings increased. The initiation of chases could be due to the need of separating the two chicks before feeding them in order to increase feeding efficiency or, alternatively, be a reaction of the parent to the harassment from two begging, competing chicks. (Auth.)

B-56200

Russell, S., **Water relations and nutrient status of bryophyte communities at Marion Island (sub-Antarctic),** IAB Conference of Bryoecology, Budapest-Vácrátót, Hungary, 5-10 August, 1985. Proceedings, Part A, edited by T. Pócs, T. Simon, Z. Tuba and J. Podani (Symposia biologica Hungarica, Vol. 35), Budapest, Akadémiai Kiadó, 1987, p.39-57, Refs. p.55-57.

DLC QK533.6.I23

An outline is given of the existing phytosociological classification of bryophyte-rich communities at Marion I. Detailed relevé data recorded at the time of the original survey indicate soil moisture as a principal factor controlling bryophyte distribution. Studies of bryophyte water relations at Marion I. support this conclusion while emphasizing the additional role of nutrient status in relation to species composition, especially at biotically influenced and well-drained sites. (Auth.)

B-56201

Smith, R.I.L., **Bryophyte propagule bank of Antarctic fellfield soils,** IAB Conference of Bryoecology, Budapest-Vácrátót, Hungary, 5-10 August, 1985. Proceedings, Part A, edited by T. Pócs, T. Simon, Z. Tuba and J. Podani (Symposia biologica Hungarica, Vol. 35), Budapest, Akadémiai Kiadó, 1987, p.233-245, 19 refs.

DLC QK533.6.I23

Soil samples from unvegetated areas of fellfield on Signy I. were incubated at temperatures from 2 to 25°C for up to 23 weeks to determine the colonization potential of the soil propagule bank. Numerous bryophyte colonies, belonging to a total of 14 taxa, developed from buried spores and gametophyte fragments. Species diversity and production was greatest between 10 and 20°C but growth of some taxa occurred at the extreme temperatures. A much greater incidence of colonization occurred in superficial than in sub-surface samples, but amending the soils with nutrients did not increase the number of species or productivity. Most were typical fellfield taxa, but the dominant species were not represented. The propagule bank also contained an element of exotic species providing evidence of long-distance wind dispersal. The importance of this reservoir of diaspores in the soil with regard to primary colonization and succession is discussed. (Auth. mod.)

B-56202

Bergstrom, D.M., Selkirk, P.M., **Reproduction and dispersal of mosses on Macquarie Island,** IAB Conference of Bryoecology, Budapest-Vácrátót, Hungary, 5-10 August, 1985. Proceedings, Part A, edited by T. Pócs, T. Simon, Z. Tuba and J. Podani (Symposia biologica Hungarica, Vol. 35), Budapest, Akadémiai Kiadó, 1987, p.247-257, 21 refs.

DLC QK533.6.I23

Reproductive strategies of some moss species on subantarctic Macquarie I. are described together with a general discussion of reproduction of mosses on the island. The resistance of propagules of two species of moss to salinity, and of one species to drying and low temperature, is discussed. Implications for long-distance dispersal mechanisms are explored. (Auth.)

B-56203

Kanda, H., **Ecology of the moss vegetation in the Syowa Station area, Enderby Land, Antarctica,** IAB Conference of Bryoecology, Budapest-Vácrátót, Hungary, 5-10 August, 1985. Proceedings, Part A, edited by T. Pócs, T. Simon, Z. Tuba and J. Podani (Symposia biologica Hungarica, Vol. 35), Budapest, Akadémiai Kiadó, 1987, p.259-267, 14 refs.

DLC QK533.6.I23

The moss vegetation in the Showa Station area was observed in relation to some ecological aspects during 1982-1984. Seven moss sociations were recognized at the outcrops on the Soya Coast. Some colonies of *Bryum* sp. were found with sporophytes. Furthermore, life history characteristics and ecology of six species are described. (Auth.)

B-56204

Selkirk, P.M., Seppelt, R.D., **Species distribution within a moss bed in Greater Antarctica,** IAB Conference of Bryoecology, Budapest-Vácrátót, Hungary, 5-10 August, 1985. Proceedings, Part A, edited by T. Pócs, T. Simon, Z. Tuba and J. Podani (Symposia biologica Hungarica, Vol. 35), Budapest, Akadémiai Kiadó, 1987, p.279-284, 2 refs.

DLC QK533.6.I23

On Bailey Peninsula, near Casey Station, bryophytes most commonly grow in crevices between rocks but extensive moss beds occur in a few favorable sites. Species composition and soil moisture levels were examined along a line transect across a moss bed. It appears that dispersal to and within the site has influenced the pattern of distribution of the 3 species present, whereas their growth-form is determined by the moisture regime of the substratum. (Auth.)

B-56205
Xavier Filho, L., Guzmman, G., Rudolph, E.D., **Observations on nutrient flow in a maritime "Antarctic Tundra" community,** *Boletim da Sociedade Broteriana. 2.a Série,* 1989, Vol.62, p.97-106, With Portuguese summary. 14 refs.

DLC QK1.S28 1989

The antarctic tundra in the Admiralty Bay region was studied from its prinicpal elements showing the nutrient flow among these elements with a perfect biological integration between terrestrial and marine ecosystems and their environments. (Auth.)

B-56206
Xavier Filho, L., Leite, J.B.M., Lima, E.D., **Antimicrobial activity of antarctic lichens** [Atividade antimicrobiana de líquens antárticos], *Boletim da Sociedade Broteriana. 2.a Série,* 1990, Vol.63, p.93-98, In Portuguese. 9 refs.

DLC QK1.S28 1990

Laboratory experiments carried out with lichens collected in Antarctica are described. The primary objective was to continue the *in vitro* studies of the antimicrobial and antifungal activity of antarctic lichens. Results are discussed and presented in tables.

B-56247
Miller, W.R., Heatwole, H., **Tardigrades of the Australian Antarctic Territories: the northern Prince Charles Mountains, East Antarctica,** *Linnean Society of New South Wales. Proceedings,* May 1, 1996, Vol.116, p.245-260, Refs. p.258-260.

During the austral summer of 1990-91, a survey of Tardigrada inhabiting terrestrial mosses and lichens was conducted in the northern Prince Charles Mountains. Five genera and 6 species were recovered including *Echiniscus jenningsi, Diphascon sanae, Hypsibius antarcticus, Macrobiotus blocki, Macrobiotus stuckenbergi,* and *Milnesium tardigradum.* A model is proposed for the dispersal of tardigrades to and within East Antarctica. Cryptobiotic tardigrade tuns are carried aloft and over Antarctica via upper air currents, then descend over the center of the continent and radiate outward to peripheral areas on katabatic winds. The deflection of surface winds by Coriolis forces allows for east to west dispersal from established populations along the East Antarctic Coast. Males have seldom been reported in the genus *Echiniscus,* but 30% of the *E. jenningsi* found were male. The strategy of sexual reproduction is discussed relative to distributional and survival challenges of tardigrades in East Antarctica. (Auth.)

B-56248
McConnell, B.J., Fedak, M.A., **Movements of southern elephant seals,** *Canadian journal of zoology,* Aug. 1996, 74(8), p.1485-1496, With French summary. Refs. p.1495-1496.

Twelve southern elephant seals *(Mirounga leonina)* were tracked for an average of 119 days as they left their breeding or moulting beaches on the island of South Georgia between 1990 and 1994. Females travelled either eastward up to 3000 km away to the open southern ocean or to the continental shelf on or near the Antarctic Peninsula. Males either stayed close to South Georgia or used South Georgia as a base for shorter trips. The females all left South Georgia in a directed manner at an average rate of 79.4 km/day over at least the first 15 days. Thereafter travel was interrupted by bouts of slower travel or stationary phases. The latter were localized at sites on the continental shelf or along its edge. Three seals that were tracked over more than one season repeated their outward direction of travel and used some of the same sites in subsequent years. The magnitude of the movements makes most of the southern ocean potentially available to elephant seals. (Auth.)

B-56249
MacColl, R., Eisele, L.E., Williams, E.C., Bowser, S.S., **Discovery of a novel R-phycoerythrin from an antarctic red alga,** *Journal of biological chemistry,* July 19, 1996, 271(29), p.17,157-17,160, 23 refs.

A novel biliprotein, named R-phycoerythrin IV, has been discovered. It absorbs blue light better than any other known red algal biliprotein. The protein was found in *Phyllophora antarctica,* a benthic macroalga, which grows beneath the coastal waters of McMurdo Sound. Fluorescence emission and fluorescence excitation polarization spectroscopy demonstrated that R-phycoerythrin IV behaved as a typical R-phycoerythrin in the functioning of energy migration and has an emission maximum at 577 nm. The circular dichroism (CD) spectrum of the chromophores was compared with visible absorption spectrum, and both were deconvoluted. This process showed the energy states of various individual chromophores. The molecular weight of the protein suggested a $\alpha_6\beta_6\gamma$ polypeptide structure, and far UV CD studies revealed polypeptides with highly α-helical secondary structures. Dynamic light scattering indicated that the protein had a 5.54 nm radius, and its shape was nonspherical. R-phycoerythrin was also purified from a second benthic antarctic red alga, *Iridaea cordata.* Its spectroscopic properties were similar to those of some R-phycoerythrins from nonpolar regions. (Auth. mod.)

B-56256
Gómez, I., Wiencke, C., **Photosynthesis, dark respiration and pigment contents of gametophytes and sporophytes of the antarctic brown alga *Desmarestia menziesii*,** *Botanica marina,* Mar. 1996, 39(2), p.149-157, Refs. p.155-157.

Photosynthetic performance, dark respiration, pigment concentration and fresh:dry weight ratios were measured in different life history stages of the antarctic brown alga *Desmarestia menziesii* J. Agardh cultivated under simulated antarctic conditions. Small gametophytes had the highest pigment concentrations. Adult reproductive plants contained the lowest pigment concentrations. Net photosynthetic rates (P_{max}), on a fresh weight basis, were significantly higher in gametophytes, however, when normalized to Chl *a*, P_{max} was higher in adult reproductive plants. Dark respiration and photosynthetic efficiency (α), calculated both on a fresh weight and Chl *a*, basis, were considerably higher in the early developmental stages, i.e. gametophytes and young sporophytes. Differences in the light saturation parameter I_k were also found with adult plants having higher values. Dry:fresh weight ratios of adult sporophytes were approximately twice those of gametophytes and young sporophytes. These results indicate that small gametophytes and young sporophytes have shade adapted plant characteristics including high pigment content, high α-values, low I_k values and low Chl *a*-based P_{max}. These photobiological attributes are related to thallus structure in both phases, and to seasonal reproductive strategy of the species. (Auth. mod.)

B-56257
Hayakawa, K., Handa, N., Ikuta, N., Fukuchi, M., **Downward fluxes of fatty acids and hydrocarbons during a phytoplankton bloom in the austral summer in Breid Bay, Antarctica,** *Organic geochemistry,* May 1996, 24(5), p.511-521, Refs. p.520-521.

Vertical fluxes of fatty acids and hydrocarbons were measured in sinking particles collected by a time-series sediment trap in Breid Bay from Dec. 1985 to Feb. 1986. Temporal variations in fatty acid fluxes were related to changes in growth of the overlying diatom population. High contents of 21:6 alkenes and 14:0, 16:0, 16:1, 20:5 acids of the sinking particles supported the idea that the source of the sinking organic matter was mainly diatoms. 21:6 Alkenes and 20:5 acids increased in the late exponential phase of the overlying diatom bloom. Branched C_{25} alkenes were detected in the sinking particles. Measurements of changes in the fatty acid composition of the sinking particles were shown to provide useful information on the ecophysiological status of the phytoplankton population as the bloom progressed. Unsaturated fatty acid/saturated fatty acid ratios in the sinking particles indicated active growth of diatoms during the observations. High fluxes of 20:5 acids suggested a late exponential phase and a stationary phase of the overlying diatom bloom. (Auth.)

B-56258
Bischoff-Bäsmann, B., Wiencke, C., **Temperature requirements for growth and survival of antarctic Rhodophyta,** *Journal of phycology,* Aug. 1996, 32(4), p.525-535, Refs. p.533-535.

The temperature requirement for growth and the upper survival temperatures (USTs) of 15 antarctic red algal species collected on King George I. and Signy I. were determined. Two groups with different temperature requirements were identified. A "eurythermal" group includes *Rhodymenia subantarctica, Phyllophora ahnfeltioides, Gymnogongrus antarcticus,* and *Rhodochorton purpureum,* growing between 0° and 10°C with optimum values. The USTs of these species and of *Porphyra endiviifolium, Delesseria lancifolia,* and *Bangia atropurpurea* were between 22°

and 16°C. A stenothermal group includes *Pantoneura plocamioides, Myriogramme mangini, Ballia callitricha, Phyllophora antarctica, Gigartina skottsbergii, Georgiella confluens,* and *Plocamium cartilagineum* growing at 0° or ≤5°C. The USTs of these species and of *Phycodrys austrogeorgica* were between 14° and 7°C. The results are discussed in the context of present local temperature regimes at the localities where the isolates were collected. Moreover, an attempt was made to explain the geographic distribution of individual species by the temperature requirements determined in this study. (Auth. mod.)

B-56261

St. Clair, C.C., Waas, J.R., St. Clair, R.C., Boag, P.T., **Unfit mothers? Maternal infanticide in royal penguins,** *Animal behavior,* 1995, 50(5), p.1177-1185, Refs. p.1184-1185.

Crested penguins (genus *Eudyptes)* have a remarkable brood reduction system in which the first of two eggs laid is much smaller than the second and frequently disappears from the nest. In royal penguins, *E. schlegeli,* 70 of 84 pairs lost their first egg during the 4-day interval before the second was laid, and in 15 of 22 observed losses, mothers actively ejected their own eggs from the nest. Most first-egg losses (57%) occurred within a day prior to the appearance of the second egg. Parental ejection in royal penguins was not associated with high rates of extra-pair parentage: DNA fingerprinting of 13 two-chick families detected only one individual that was unrelated to its putative father. The hatching success of first eggs, which were temporarily removed and then substituted for second eggs, was only half that of second eggs that were not removed, but apparent viability differences due to egg type may have been confounded by delayed incubation and additional handling. The apparent reproductive value of first eggs was low; only one of 137 unmanipulated first eggs hatched. Some testable hypotheses are suggested for the evolution of ejection behavior in *Eudyptes.* (Auth. mod.)

B-56262

De Castellanos, Z.A., **New data on subantarctic micromolluscs** [Novedades sobre micromoluscos subantárticos (Mollusca, Gastropoda)], *Neotropica,* Dec. 1, 1988, 34(92), p.89-92, In Spanish with English summary. 8 refs.

DLC QL235.N4

New data on micromolluscs from the Falkland Is. and Argentina's superior slope (600 m) are presented. *Omalogyra taludana* sp. nov. from the superior slope is described and compared with *O. atomus* and *O. burdwoodiana.* A new distribution area for *Cirsonella kerguelensis* and some considerations on *Odostomia translucens* and *Cyclostrema gaudens* are given. For the first time *Antistreptus rolani* is illustrated. (Auth.)

B-56263

Jab/bński, B., **Diurnal pattern of changes in the number of penguins on land and the estimation of their abundance (Admiralty Bay, King George I., South Shetland Islands),** *Acta zoologica cracoviensia,* Apr. 30, 1987, 30(8), p.97-118, With Polish summary. 17 refs.

DLC QL1.A32 1987

The most suitable hours for estimating the abundance of penguins in particular phenological periods were determined on the basis of diurnal changes in their numbers. In spite of differences in diurnal behavior between *Pygoscelis papua, P. adeliae* and *P. antarctica* the most suitable time of counting falls between 17.00 and 21.00 of local time in the breeding season, and 1 to 1.5 hours before nightfall after breeding. In the incubation period, breeding partners of *P. papua* and *P. antarctica* change over at nests, usually every 1-3 days. Similar breaks in their stay on land were observed in the post-breeding period. (Auth.)

B-56264

Jab/bński, B., Krzemiński, W., Zdzitowiecki, K., **Distribution and number of fur seals, *Arctocephalus gazella* (Peters, 1875) of King George Island (South Shetlands),** *Acta zoologica cracoviensia,* Apr. 30, 1987, 30(9), p.119-136, With Polish summary. Refs. p.133-135.

DLC QL1.A32 1987

In the Admiralty Bay region, the greatest number of fur seals was observed in Feb. and Mar., reaching 33.09 animals/km of sea line. In relation to the entire sea coast of the bay (91 km); the number of fur seals varied in 1980-81 between 4.72 and 9.00 animals/km. In Apr., with the occurrence of great ice fields, this number suddenly decreased. In June and the first half of July some migrating seals appeared; at that time the winter peak in their number was observed, reaching 1.11 seals/km of sea coast (i.e. a density of 0.77 for 1 km^2 of ice field of the bay). Some of these winter migrants remained till Oct., grouped near ice cliffs and rock islands where the ice was crushed. The hypothesis is presented that these seals migrate from the volcanic Deception I. The census of seals taken on King George I. during the peak in their number in 1981 showed the presence of 4400 adult specimens. The following rookeries were visited: Stigant Pt., Tartar Pt., Penguin I., Lion's Rump and Low Head. (Auth.)

B-56265

Zapata M., J., Matamala U., M., **Thecamoebians from Lake Kitezh** [Tecamebianos del lago Kitiesh (Isla Rey Jorge, Antártica)], *Biota,* 1987, Vol.3, p.59-71, In Spanish with English summary. 15 refs.

DLC QH91.B56

The analysis of a bottom sample taken from Lake Kitezh resulted in the identification of 15 species of thecamoebians belonging to 6 families and 7 genera. Of these species, one is new for Chile, 9 are cited for the first time for the Antarctic, 14 had been previously mentioned for Chile and all of them are new for King George Is. The colonization of this geographic area by thecamoebians occurred via the aerial currents and migratory birds as the carrying agents of cysts and thecamoebians from South America. (Auth. mod.)

B-56266

Buschmann, A., **Adventive embryos formation starting from rhizoidal filaments of *Durvillaea antarctica* (Phaeophyta: Durvilleales),** *Biota,* 1987, Vol.3, p.85-90, With Spanish summary. 21 refs.

DLC QH91.B56

The spontaneous development of adventive embryos was studied starting from rhizoidal filaments of *Durvillaea antarctica.* Rhizoidal cells from *D. antarctica* embryos first show a progressive deepening of pigmentation, and later enter a cell proliferation phase. This new adventive embryo is recognizable because its rhizoial filaments develop in opposite directions. This information is discussed in relation to the described patterns given for the Fucales and as a potential propagation mechanism for *D. antarctica.* (Auth.)

B-56267

Bowman, J.P., Cavanagh, J., Austin, J.J., Sanderson, K., **Novel *Psychrobacter* species from antarctic ornithogenic soils,** *International journal of systematic bacteriology,* Oct. 1996, 46(4), p.841-848, 30 refs.

Ornithogenic soil is derived from the deposition of the fecal matter of various species of birds and is a major source of nutrient input in the antarctic marine ecosystem. A significant proportion of the microbiota of ornithogenic soil collected from an Adélie penguin colony in eastern Antarctica (Vestfold Hills ice-free zone) consisted of gram-negative, coccoid bacteria identified on the basis of their phospholipid ester-linked fatty acid and lipid class profiles as *Psychrobacter* strains. Phenotypic, genotypic, and 16S ribosomal DNA phylogenetic analyses revealed that the antarctic psychrobacters belonged to three distinct groups. Two of the groups represent the following two novel species: *Psychrobacter urativorans* sp. nov. and *Psychrobacter frigidicola* sp. nov. The third group of strains included members of the previously described species *P. immobilis* (Juni and Heym 1986). In addition, *M. phenylpyruvica* (Bøvre and Henriksen 1967) is renamed *P. phenylpyruvicus* comb. nov. on the basis of 16S ribosomal DNA phylogenetic data. The genus *Psychrobacter* is the predominant genus in ornithogenic soils in Antarctica and is diverse. (Auth. mod.)

B-56268

Rainey, F.A., Ward-Rainey, N., Kroppenstedt, R.M., Stackebrandt, E., **Genus *Nocardiopsis* represents a phylogenetically coherent taxon and a distinct actinomycete lineage: proposal of *Nocardiopsaceae* fam. nov.,** *International journal of system-*

atic bacteriology, Oct. 1996, 46(4), p.1088-1092, 27 refs.

The genus *Nocardiopsis* was shown to be phylogenetically coherent and to represent a distinct lineage within the radiation of the order *Actinomycetales.* The closest relative of the genus *Nocardiopsis* are members of the genera *Actinomadura, Thermomonospora, Streptosporangium,* and *Microtetraspora.* The intrageneric structure of the genus *Nocardiopsis* is shown to consist of a highly related species group containing *Nocardiopsis dassonvillei, Nocardiopsis alborubida,* and *Nocardiopsis antarctica* and a second group of less highly related species comprising *Nocardiopsis alba* subsp. *alba, Nocardiopsis alba* subsp. *prasina,* and *Nocardiopsis listeri. N. lucenteasis* occupies a position intermediate between the two species groups. The results of a 16S ribosomal DNA sequence analysis are generally consistent with the available chemotaxonomic, phenotypic, and DNA-DNA hybridization data. The phylogenetic position and the morpho- and chemotaxonomic properties of *Nocardiopsis* species support the creation of a family for the genus *Nocardiopsis, Nocardiopsaceae* fam. nov. Several references to the species *Nocardiopsis antarctica* or *Nocardiopsis antarcticus* identify the species as part of the lineage of the proposed new family. (Auth. mod.)

B-56269

Tamburrini, M., D'Avino, R., Fagot, A., Carratore, V., Kunzmann, A., Di Prisco, G., **Unique hemoglobin system of *Pleuragramma antarcticum*, an antarctic migratory teleost,** *Journal of biological chemistry,* Sep. 27, 1996, 271(39), p.23,780-23,785, 32 refs.

Pleuragramma antarcticum is the most abundant fish on the antarctic shelf. This pelagic species has a circum-antarctic distribution and is characterized by spawning migration. It displays the highest multiplicity of major hemoglobins (three). Hemoglobins of *P. antarcticum* display strong Bohr and Root effects; however, they reveal important functional differences in subunit cooperativity and organophosphate regulation and, above all, in the response of oxygenation to temperature. The hemoglobins have similar oxygen affinity, higher than that of the other notothenioids. Hb 1 has the α chain in common with Hb 2 and the β in common with Hb 3. The amino acid sequence of all four chains has been established. Thus the hematological features of *P. antarcticum* differ remarkably from those of antarctic notothenioids. This unique and sophisticated oxygen transport system may adequately meet the requirements of the unusual mode of life of this fish. (Auth. mod.)

B-56270

Kooyman, G.L., Kooyman, T.G., Horning, M., Kooyman, C.A., **Penguin dispersal after fledging,** *Nature,* Oct. 3, 1996, 383(6599), p.397, 8 refs.

The principal concern here is that the protection for emperor penguins under the provisions of the Antarctic Treaty and the CAMLR may cover too limited an area to give the protection intended since the protection extends only to the 60th S parallel. It is known that some, perhaps many, juvenile emperors have travelled as far as 2,845 km from Cape Washington, well beyond the 60th parallel.

B-56271

Cattaneo-Vietti, R., et al, **Optical fibres in an antarctic sponge,** *Nature,* Oct. 3, 1996, 383(6599), p.397-398, 10 refs.

Scanning electron microscopy observations on *Rossella racovitzae* show that numerous intact diatoms adhere to its spicules, thereby suggesting the development of shade-adopted diatoms inside this deep-living sponge, as observed in antarctic demosponges. The authors believe that diatom survival in these peculiar environmental conditions is helped by this light transfer by siliceous spicules.

B-56274

Amundsen, T., Lorentsen, S.H., Tveraa, T., **Effects of egg size and parental quality on early nestling growth: an experiment with the antarctic petrel,** *Journal of animal ecology,* Sep. 1996, 65(5), p.545-555, 60 refs.

In order to evaluate the potential effects of egg size, and of parental quality, on early nestling growth in the antarctic petrel, an experiment was performed in which eggs of different size were swapped between nests. From a sample of 300 nests with eggs of known size, eggs belonging to the lower quartile (small eggs) and those of the upper quartile (large eggs) with respect to volume were selected. Half of the small eggs were exchanged with small eggs from other nests, and the other half with large eggs. A similar procedure was used for large eggs. Growth and survival of the nestlings were recorded until 12 days old. Hatching success was positively related to egg size. Egg size influenced nestling body mass until the age of three days, and tarsus length was affected until 12 days old. These effects reflected the influence of egg size on hatchling size. No effect of parental quality was found on foster nestling size or growth until 12 days old. Why these variations are maintained in this and other species is discussed. (Auth. mod.)

B-56275

Delille, D., Bouvy, M., **Subantarctic sulfate-reducing bacteria and some physicochemical and biological parameters** [Microflores sulfatoréductrices en milieu subantarctique. Relations avec quelques paramètres physicochimiques et biologiques (Microflores totales et hétérotrophes)], *Centre National de la Recherche Scientifique. Actes de colloques,* 1986, N.3, Colloque International de Bactériologie Marine, 2nd, Brest, Oct. 1-5, 1984 (Second Intertnational Colloquium of Marine Bacteriology, Brest, Oct. 1-5, 1984), p.265-272, In French with English summary. Refs. p.271-272.

DLC QR106.I58

The archipelago of Kerguelen with its complex fjord distribution is particularly interesting for the study of anoxic systems. Between 1968 and 1972, several stations were investigated fortnightly. One of these was further sampled weekly throughout 1982. Each sample series of sediment included the superficial aerobic and subsuperficial anaerobic levels. Each level was examined for direct epiflorescent counts, heterotrophic and sulfate-reducing bacterial numbers by M.P.N. methods, organic carbon and sulfide measurements. Sulfate reducing bacteria seemed less related to total biomass than the heterotrophic microflora, the latter being dependent on organic supplies. The hydrogen sulfide production was directly related to the presence of sulfate reducers; however there was accumulation only if physical conditions of the sediment allowed it. Sulfate reduction played an essential role in anoxic control but had a limited influence on the mineralization of organic input. (Auth.)

B-56277

Mel'nikov, I.A., Spiridonov, V.A., **Antarctic krill under perennial sea ice in the western Weddell Sea,** *Antarctic science,* Dec. 1996, 8(4), p.323-329, Refs. p.328-329.

The results of underwater observations and sampling of krill *(Euphausia superba)* in the western Weddell Sea during the joint Russian-USA Ice Station Weddell-1 Expedition (Feb. 11-June 9, 1992) are presented. Krill was sampled from the same large ice floe composed of both 1- and 2-year ice as it drifted northward for a distance of c. 700 km. Abundance estimates for krill under this floe were in the range 0.1-6.25 ind/m^2. Krill aggregate in areas where rafting of ice floes and formation of new ice occur, or around a protected diving hole. The krill sampled consisted mainly of furcilia 6 and post-larvae which did not belong to the 0+ group originating in this (1991-92) year, but presumably hatched in the summer season of 1990-91 and developed very slowly so that the end of the following summer season, larval stages were still present in the population. No increase of the mean krill size was observed during 2.5 months of observation. The role of larval advection for the maintenance of krill population in the Weddell Sea is discussed. (Auth.)

B-56279

Rudiakov, IU.A., **Mesozooplankton biomass distribution in the upper 100m layer of the Atlantic sector of the Southern Ocean,** *Antarctic science,* Dec. 1996, 8(4), p.343-348, 35 refs.

The distribution of annual mean biomass of mesozooplankton (animals in the size range 0.2-20 mm) in the upper layer (0-100 m) of the Atlantic sector of the southern ocean was mapped. The map was constructed from 4216 measurements at 2184 oceanographic stations, from the Russian and Brazilian archive records, from published sources, and from the British Oceanographic Data Centre. The annual mean mesozooplankton biomass value for the South Atlantic is estimated in this study to be 93 mg/m^3 wet weight. (Auth.)

B-56281

Van De Vijver, B., Beyens, L., **Freshwater diatom communities**

of the Strømness Bay area, South Georgia, *Antarctic science,* Dec. 1996, 8(4), p.359-368, 24 refs.

Modern diatom samples were collected from 43 sites across the Strømness Bay area of South Georgia. From 115 taxa belonging to 22 genera, six diatom assemblages were distinguished. A CCA-analysis indicated that the assemblages are linked to pH and conductivity ranges, and habitat structure. The *Eunotia paludosa* var. *paludosa-Eunotia subarcuatoides* assemblage occurs in small acid water bodies. Samples of the *Fragilaria germainii-Pinnularia* aff. *anglica* assemblage are found in pools with a relatively high conductivity. The *Fragilaria neoproducta* assemblage and the *Achnanthes subatomoides-Navicula vitabunda* assemblage are mainly found in larger pools and lakes. This relationship between the assemblages and pH was comparable with results found in the testate amoebae fauna of South Georgia. (Auth.)

B-56288

Heykam, G., Gómez, I., Wiencke, C., Iken, K., Klöser, H., **Photosynthetic characteristics and C:N ratios of macroalgae from King George Island (Antarctica),** *Journal of experimental marine biology and ecology,* Oct. 25, 1996, 204(1-2), p.1-22, Refs. p.19-22.

During an expedition to King George I., the photosynthetic characteristics of 36 macroalgal species common to the South Shetland Is. were investigated. Photosynthesis versus irradiance curves were obtained by determination of oxygen consumption or production of the species. Rates of maximum photosynthesis (P_{max}) were similar to P_{max} rates measured in earlier field and laboratory studies of antarctic species. The present investigation shows that the photosynthetic characteristics of antarctic macroalgae are clearly related to thallus structure, with highest rates of P_{max}, photosynthetic efficiency (α) and dark respiration and highest Chl *a* contents being observed in filamentous and foliose species. The C:N ratios were significantly lower in the filamentous and foliose compared to the terete and leathery species. In general, low values of between five and ten were determined reflecting the high inorganic N supply found in antarctic waters. (Auth. mod.)

B-56289

Helbling, E.W., Chalker, B.E., Dunlap, W.C., Holm-Hansen, O., Villafañe, V.E., **Photoacclimation of antarctic marine diatoms to solar ultraviolet radiation,** *Journal of experimental marine biology and ecology,* Oct. 25, 1996, 204(1-2), p.85-101, Refs. p.77-101.

The present study was carried out at Palmer Station during the austral spring-summer of the years 1993 and 1994. Two centric diatom species and two pennate species were isolated from natural phytoplankton assemblages and exposed to solar radiation to study long term (more than 1 week) photoacclimation to ultraviolet radiation (UVR). At the beginning of the experiments, three of the cultures had relatively low concentrations of UV-absorbing compounds and photosynthetic rates were significantly inhibited by UVR. At the end of the experiments, however, the two centric diatom species had high contents of mycosporine-like amino acids (MAAs) and did not show any significant differences in photosynthetic rates when exposed to either UVR + PAR (photosynthetic available radiation) or just to PAR. The synthesis of MAAs was slightly less when samples were exposed only to PAR than when exposed to UVR in addition to PAR. These results provide further evidence that MAA compounds are synthesized in response to high light conditions and that they do decrease the photoinhibitory effects of UVR. (Auth. mod.)

B-56290

Klöser, H., Quartino, M.L., Wiencke, C., **Distribution of macroalgae and macroalgal communities in gradients of physical conditions in Potter Cove, King George Island, Antarctica,** *Hydrobiologia,* Oct. 7, 1996, 333(1), p.1-17, 57 refs.

The vegetation of a small fjord and its adjacent open shore on King George I. was documented by subaquatic video. The distribution of individual species of macroalgae and the composition of assemblages were compared with gradients of light availability, hydrography, slope inclination, substratum, and exposition to turbulence and ice. The sublittoral fringe is usually abraded by winterly ice floes and devoid of large, perennial algae. Below this zone, the upper sublittoral is dominated by *Desmarestia menziesii* on steep rock faces, where water movements become irregular, or by *Ascoseira mirabilis* and *Palmaria decipiens* on weakly inclined slopes with steady rolling water movements. *Himantothallus grandifolius* also prevails in a mixed assemblage under the influence of grounding icebergs. Most of the smaller algae are opportunists with different degrees of tolerance for turbulence, but some apparently need more stable microhabitats and thus are dependent from continuing suppression of competitive large phaeophytes. (Auth. mod.)

B-56295

Amat, J.A., Carrascal, L.M., Moreno, J., **Nest defence by Chinstrap Penguins *Pygoscelis antarctica* in relation to offspring number and age,** *Journal of avian biology,* June 1996, 27(2), p.177-179, 22 refs.

The authors manipulated clutches of Chinstrap penguins to examine the effects of brood size and offspring age on brood defense levels. Nest defense intensity increased with increasing offspring age. Experimental birds reduced nest defense intensity after losing one egg. These results support predictions derived from life-history theory which assumes changes in nest defense intensity to be related to changes in the reproductive value of the brood. (Auth.)

B-56297

Wilson, G.J., Clowes, C.D., ***Arachnodinium*, a new dinoflagellate genus from the Lower Tertiary of Antarctica,** *Palynology,* 1982, Vol.6, p.97-104, 7 refs.

DLC QE993.A49a

Arachnodinium antarcticum gen. et sp. nov., a distinctive trabeculate dinoflagellate cyst, is described from erratics of probable Eocene age in the McMurdo Sound area. Additional records of the taxon are provided from Lower Tertiary localities in South America, from DSDP sites in the south Tasman Sea, and from other antarctic localities. (Auth.)

B-56300

Ahn, I.Y., Lee, S.H., Kim, K.T., Shim, J.H., Kim, D.Y., **Baseline heavy metal concentrations in the antarctic clam, *Laternula elliptica*, in Maxwell Bay, King George Island, Antarctica,** *Marine pollution bulletin,* Aug./Sep. 1996, 32(8/9), p.592-598, 28 refs.

Laternula elliptica from Collins Harbor tends to strongly accumulate most heavy metals with tissue concentrations being comparable to those of mussels and oysters in temperate waters. For the majority of the metals, significantly higher concentrations were measured in the kidney than in any other soft tissues. In addition, Cd concentration in the kidney was positively correlated with that of Zn, Pb and Mn, reflecting the detoxification of the accumulated heavy metals. These results suggest that *L. elliptica* can be used as a suitable biomonitor for long-term monitoring of heavy metal contamination in the antarctic coastal waters. However, habitat sediment is highly elevated with Cu (77 µg/g dry weight), which has apparently been derived from lithogenic sources in the surrouding land via meltwater inflow during austral summer. No comparative data, however, are yet available for *L. elliptica* in other regions, and possible influence of the Cu elevation in this region on the body burden of *L. elliptica* is discussed in comparison with those of another common antarctic bivalve, *Adamussium colbecki.* (Auth. mod.)

B-56302

Fryxell, G.A., **Planktonic marine diatom winter stages: antarctic alternatives to resting spores,** International Diatom Symposium, 11th, San Francisco, California, Aug. 12-17, 1990. Proceedings. Edited by J.P. Kociolek and Memoirs of the California Academy of Sciences, No. 17, San Francisco, California Academy of Sciences, 1994, p.437-448, Refs. p.443-446.

DLC Q11.C17 Vol.17

Thalassiosira species are abundant in the austral spring in antarctic waters, when lightly silicified vegetative stages produce long chains. However, those that are preserved in the sediment have heavily silicified valves and thus contrast with the spring stages. Some heavily silicified valves have been confirmed to be resting spores. However, heavily silicified valves of some species were products of a winter growth stage. During the winter, these cells were even found from 150-200 m depth in the water column, deeply pigmented, and packed with storage products. Particularly evident in the sediment in Prydz Bay were the heavily silicified valves of *T. ritscheri* (Hustedt) Hasle, nearly linear in areolar pattern, and *T. gracilis* (Karsten) Hustedt, with the central areolae more widely spaced on the thickened winter valves. The heavily silicified winter valves, like the specialized winter growth stage with distinctive morphology of *Eucampia*, appear to be an oceanic alternative to the production of resting spores. Thus, when light is limiting, sporadic growth is possible for these species without the loss of one cell division or thecae. This immediate response by some species to dynamic growth conditions gives an evolutionary advantage at the ice edge and leaves a record of winter growth in the sediment. (Auth. mod.)

B-56309
Gerasimchuk, V.V., Neelov, A.V., Tankevich, P.B., Shandikov, G.A., **Fishes from the Davis Sea and Prydz Bay (AzCherNIRO expeditions in 1978 and 1983)** [Ryby iz moreĭ Deĭvisa i Mousona i iz zaliva Olaf-Priuds (po materialam nauchno-promyslovoĭ ekspeditsii AzCherNIRO 1978 i 1983 gg.)], *Akademiia nauk SSSR. Zoologicheskiĭ Institut. Trudy. Ekologiia i morfologiia ryb (Ecology and morphology of fishes)*, 1990, Vol.222, p.18-43, In Russian with English summary. 24 refs.
DLC QL1.A4253

The paper presents faunistic and some biological data (size and weight composition, fecundity, and food habits) on 55 species of pelagic and benthic fishes belonging to 35 genera and 13 families occurring in continental seas of East Antarctica. (Auth. mod.)

B-56310
Prirodina, V.P., **Karyotype diversity in three fish species of the family *Bathydraconidae* from western Antarctic** [Kariotipy trekh vidov ploskonosovykh ryb (semeĭstvo *Bathydraconidae*) iz zapadnoĭ Antarktiki s zamechaniiami o kariotipicheskom raznoobrazii], *Akademiia nauk SSSR. Zoologicheskiĭ Institut. Trudy. Ekologiia i morfologiia ryb (Ecology and morphology of fishes)*, 1990, Vol.222, p.55-62, In Russian with English summary. 26 refs.
DLC QL1.A4253

Karyotypes of three species of the family Bathydraconidae from the Scotia Sea, *Psilodraco breviceps* Norman (2n=48; NF=48), *Parachaenichthys georgianus* (Fishcer) (2n=48; NF=58), and *Prionodraco evansii* Regan (2n=20; NF=40) are described for the first time. The karyotypes of these three species and that of *Racovitzia glacialis* Dollo (2n=36; NF=40) point to the heterogeneous character of the family demonstrated by the variability of the diploid chromosome number (2n=20-36-48). Karyotypic diversity in the zoogeographic subdivisions of the antarctic region is discussed. (Auth. mod.)

B-56314
Hayward, P.J., **Antarctic cheilostomatous bryozoa,** Oxford, Oxford University Press, 1995, 355p., Refs. p.332-343.
DLC QL398.C5H38 1995

This account of the antarctic Cheilostomatida is the result of research conducted between 1985 and 1991. The taxonomic results of this work, including the description of new taxa and the revision of existing taxa, the construction of synonymies, and some contributions to classification, have been published in a series of research papers. Most of the conclusions arrived at in these papers have been upheld in this synopsis, although a few have been revised or modified following the examination of further material. No new taxa are introduced here, but a substantial proportion of the species included is redescribed and illustrated for the first time, a number of new synonymies is justified and some new taxonomic combinations are presented. This synopsis is essentially a practical guide for the identification of the antarctic Cheilostomatida. It includes an artificial dichotomous key to the genera. Each family and genus is fully diagnosed, and for each genus there is a key for the identification of its constituent species.

B-56320
Bobrovskaia, N.D., Belova, Z.I., **Activity of lanternfish proteases and lipase** [Aktivnost' proteaz i lipaz svetiashchegosia anchousa], Issledovaniia po tekhnologii rybnykh produktov. Sbornik nauchnykh trudov. (Processing fishery products. Collection of papers). Edited by V.P. Bykov, Moscow, VNIRO, 1986, p.118-123, In Russian with English summary. 8 refs.
DLC SH336.S6I77 1986

The analysis of *Electron caresbergi, E. antarctica* and *Gumnoscopelus nicholsi* caught in Jan.-Mar. in antarctic areas has shown that the proteolytic activity is concentrated in the gastrointestinal tract. The effect of proteases is pronounced in the acid, weak-alkaline and alkaline zones of the tract, and their activity is likely to be food spectrum-dependent. A direct relationship between fish size, lipid content and lipase activity was established. (Auth.)

B-56322
Gebruk, A.V., **Finding of pelagic larvae of Elasipoda Holothurioidea** [O nakhodke pelagicheskikh lichinok bokonogikh goloturiĭ (Holothurioidea, Elasipoda)], *Zoologicheskiĭ zhurnal*, Aug. 1990, 69(8), p.150-152, In Russian with English summary. 5 refs.
DLC QL1.Z747

Illustrated descriptions are given of two pelagic 2.6 and 3.2 mm long larvae of Elpidiidae and 3.5 mm long larvae of Pelagothuriidae from Antarctica. The data available on the larval stages of Elasipoda are analyzed. Development of central ambulacral legs in larvae of Pelagothuriidae is treated as a testimony of their proximity to Psychropotidae.

B-56323
Menshutkin, V.V., Petrushevskaia, M.G., **Classification methods of radiolarians Lampromitridae (Nassellaria)** [Nekotorye metody klassifikatsii radioliarniĭ semeĭstva Lampromitridae (Nassellaria)], *Zoologicheskiĭ zhurnal*, June 1989, 68(6), p.5-14, In Russian with English summary. 7 refs.
DLC QL1.Z747

A cladistic analysis of 27 radiolarian species belonging to Lampromitridae family has been carried out. Seven characters were used for the analysis. The resultant cladogram is compared with the data on the phylogeny of the antarctic representatives of the family obtained by conventional techniques of the comparative morphology and paleontology. A computer program has been developed which compares all the species mentioned in all 29 characters conventionally used in taxonomy. For classification of the species in question the resultant phenogram is preferable to the cladistic techniques.

B-56325
IAkush, E.V., Golovnia, R.V., Zhuravleva, I.L., **Volatile organic bases in canned krill** [Letuchie organicheskie osnovaniia konservirovannogo miasa krilia], *Rybnoe khoziaĭstvo*, Aug. 1986, No.8, p.76-78, In Russian.
DLC SH1.R8 1986

Characterization of aroma of concentrate from volatile organic bases in canned krill was studied; these bases were identified and sensorily evaluated. The volatile bases were extracted with ethyl ether, re-extracted with 5% HCl, regenerated from the salts and analyzed by GC. A fraction of the volatile organic bases had an aroma similar to that of krill and was significant for aroma formation. Fifty-eight compounds were identified, of which 24 were determined for the first time in seafoods. No compounds with a typical aroma of shrimps were detected. Shrimp aroma possibly arises from the interaction of several components.

B-56326
IAkush, E.V., Golovnia, R.V., Zhuravleva, I.L., **Changes in volatile organic bases during canning of krill** [Izmenenie sostava letuchikh organicheskikh osnovaniĭ v protsesse prigotovleniia konservov iz miasa krilia], *Rybnoe khoziaĭstvo*, Sep. 1986, No.9, p.71-73, In Russian.
DLC SH1.R8 1986

Changes in quantitative and qualitative composition of nitrogenous compounds were studied during canning of krill; heating caused considerable changes in the composition of organic bases. Three nitrogenous compounds were identified in krill meat ready for sterilization, and 28 after sterilizing, of which 70% were alkyl thiazoles. It is assumed that the meat contains non-volatile unstable S-compounds before it is sterilized; these produce the alkyl thiazoles on heating.

B-56327
Mrochkov, K.A., Darman'ian, P.M., Koval', IU.L., Blazhek, I.L., **Physico-mechanical and hygroscopic properties of antarctic shrimp meal** [Fiziko-mekhanicheskie i gigroskopicheskie svoĭstva muki iz antarktichekoĭ krevetki], *Rybnoe khoziaĭstvo,* Oct. 1986, No.10, p.71-74, In Russian.

DLC SH1.R8 1986

Physico-mechanical properties of loose-stored shrimp meal were studied to determine their effect on moisture and lipids content. Data on grain size of the meal and bulk density, coefficient of dynamic strength, porosity, internal friction coefficient and moisture content are tabulated. The meal is typified by low bulk density, high ability to compact, dustiness and hygroscopicity, which are all adverse factors for storage and transport. These shortcomings are eliminated in granulated product.

B-56328
Gordeev, K.IU., Pridachina, N.N., Filarin, V.N., Bondarenko, S.V., Batrakov, S.G., **Isolation of polyenoic phosphatidylcholine and phosphatidylethanolamine from antarctic krill** [Vydelenie polienovykh fosfatidilkholina i fosfatidiletanolamina iz antarkticheskogo krilia], *Prikladnaia biokhimiia i mikrobiologiia,* Jan.-Feb. 1992, 28(1), p.145-151, In Russian with English summary. 16 refs.

DLC QH345.P7

Three approaches to the isolation of phosphatidylcholine and phosphatidylethanolamine enriched in eicosapentanoyl and docasahexaenoyl residues from the total lipids of antarctic krill *(Euphausia superba* Dana) are described. A new method is proposed for preparation of small amounts (up to 1 g) of the high purified phospholipids (approx. 99%), which is based on DEAE-Spherone column chromatography. This method enables the isolation of the individual carotenoid, triacylglycerol and lysophosphatidylcholine fractions. To isolate larger amounts of the same phospholipids (up to 20 g), but with a purity grade of about 95%, column chromatography on silica gel is recommended. (Auth.)

B-56329
Paukova, L.M., Baĭdalinova, L.S., Mosolov, V.V., **Some properties of the enzyme preparation "Euphasiidin"** [Nekotorye svoiĭstva fermentnogo preparata "Eufaziidin"], *Prikladnaia biokhimiia i mikrobiologiia,* July-Aug. 1992, 28(4), p.636-640, In Russian with English summary. 16 refs.

DLC QH345.P7

Main biochemical properties of an enzyme preparation from krill *(Euphausia superba)* were studied. The molecular weight of krill trypsin-like proteinase was found to be 25 kD. The isoelectric points of proteinases are 4.61, 6.42, and 6.98. At 40-45°C Euphasiidin actively hydrolyses casein and hemoglobin at pH 8.0 and 5.0, respectively. (Auth.)

B-56330
Mühlenhardt-Siegel, U., **Some remarks on the taxonomy of Antarctic Leuconidae (Cumacea: Crustacea) with a description of a new species *Leucon intermedius* n.sp.,** *Helgoländer Meeresuntersuchungen,* 1996, 50(3), p.391-408, 11 refs.

The newly described species *Leucon intermedius* n.sp. differs from other known *Leucon* species by an inconspicuous antennal notch and the presence of only a few teeth at the dorsomedian crest. The species most similar to *L. intermedius* are *L. septemdentatus* and *L. inexcavatus* from the southern ocean. A table is given to allow direct comparison of the characteristics of all *Leucon* species known from these waters. Forty-one specimens of *L. intermedius* n.sp. were collected at depths ranging from 109 to 791 m in the vicinity of the Amery Depression and near King George I. Problems in distinguishing the antarctic/subantarctic species of the genus *Eudorella* are discussed. The shape of the antennal notch is suggested as a better characteristic to distinguish the *Eudorella* species than the proportions of the articles of extremities. On the basis of this criterion, samples at the Zoological Museum, Hamburg are made up of two species of *Eudorella: gracilior* and cf. *fallax.* (Auth. mod.)

B-56334
Barrera-Oro, E.R., Casaux, R.J., **Validation of age determination in *Notothenia coriiceps,* by means of a tag-recapture experiment at Potter Cove, South Shetland Islands,** *Archive of fishery and marine research,* 1996, 43(3), p.205-216, With German and Spanish summaries. 19 refs.

Of 409 *Notothenia coriiceps* specimens tagged and released at Potter Cove in successive years from 1989 to 1992, 9 were found recaptured at the same site after periods of between 11 and 21 months. A comparison was carried out between checks found in scales removed before and after the period of release. In scales of those specimens recovered after 11 to 13 months, one extra annulus was laid down. The same analysis in one individual recovered after 21 months, resulted in 2 extra closely spaced sclerites zones, which corresponded with an elapse of two winter seasons. The comparative analysis between scales taken at recapture and otolith cross sections of the same individual permitted a simultaneous counting of the annuli with good agreement. These results validate the principle of annual deposition of the annulus in scales and otoliths of *N. coriiceps.* A preliminary analysis of scales regenerated after release indicates that these observations are of value in validation studies. (Auth.)

B-56339
Watanuki, Y., **Sea ice and ecology of Adélie penguins,** *Polar news,* Aug. 1996, No.63, p.39-42, In Japanese.

A general account of observations of an Adélie penguin rookery at Fukuro Cove in Lützow-Holm Bay, from Dec. 17, 1995 to Feb. 8, 1996 is presented. Observations were conducted from a portable hut imported from Australia, called an apple hut. Radio transmitters and micro data loggers were attached to the backs and flippers of penguins to monitor foraging and diving. Prey from analysis of stomach contents consisted mainly of krill and to a lesser extent, shrimp, but the nototheniid fish, *Trematomus bernacchii* Boulenger (Japanese popular name: showa gisu), was also found. Adélie penguins often forage in tidal cracks in the fast ice or in open water off floating sea ice or icebergs. Though Adélie penguin populations fluctuate from year to year, the trend all around the Antarctic has been toward an increase. It is suggested that the increase in the penguin population may be due to decreased competition for krill from a decrease in the whale population. It is also suggested that in the future, global warming could be an indirect factor in their population increase by reducing the thickness and concentration of sea ice, thereby making their foraging areas larger and more accessible.

B-56343
Féral, J.P., Poulin, É., **Biodiversity: why are there so many sea-urchin species brooding in the southern ocean?** [Biodiversité: pourquoi y-a-t-il tant d'espèces d'oursins incubants dans l'océan Austral?], Institut Français pour la Recherce et la Technologie Polaires. Rapport d'activité: Année 1995 et campagnes d'été 95-96 (French Institute for Polar Research and Technology. Activity report for 1995 and the summer of 1995-1996), Plouzané. France, IFRTP, 1996, p.40-43, In French. 6 refs.

The principal types of the development of the sea urchins *Abatus cordatus* are described and illustrated, and their spatial distribution in the subantarctic ocean is discussed and shown in a figure. The consequences of brooding on the genetic structure of the species and on the long-term evolution of the clade are examined in relation to the tectonic and climatic history of Antarctica.

B-56344
Chapuis, J.L., Frenot, Y., **Restoration programs on Amsterdam I. and the Kerguelen Is.** [Restauration d'îles subantarctiques françaises: programmes en cours sur l'île Amsterdam et dans l'archipel Kerguelen], Institut Français pour la Recherche et la Technologie Polaires. Rapport d'activité: Année 1995 et campagnes d'été 95-69 (French Institute for Polar Research and Technology. Activity report for 1995 and the summer of 1995-1996), Plouzané, France, IFRTP, 1996, p.44-50, In French. 11 refs.

Due to the degradation of environmental systems on Amsterdam I. and the Kerguelen Is., restoration programs were carried out by enclosures, separation of bovine herds, and eradication of the rabbits. The methods used are described and their effectiveness is evaluated.

See also:
A-54757 A-54964 A-55239 A-55291 A-55292 A-55436 A-55533

A-55792 A-56319 D-54588 E-54083 E-54084 E-54188 E-54237
E-54253 E-54301 E-54353 E-54361 E-54380 E-54516 E-54523
E-54589 E-54595 E-54596 E-54609 E-54632 E-54674 E-54714
E-54717 E-54718 E-54760 E-54814 E-54968 E-54979 E-54989
E-54992 E-55042 E-55069 E-55102 E-55159 E-55165 E-55247
E-55289 E-55514 E-55561 E-55653 E-55654 E-55657 E-55679
E-55682 E-55746 E-55747 E-55786 E-55838 E-55905 E-55906
E-55907 E-55908 E-55909 E-55910 E-55911 E-55912 E-55913
E-55921 E-55922 E-55975 E-56018 E-56113 E-56114 E-56276
E-56278 E-56303 E-56305 E-56336 F-54106 F-54257 F-54347
F-54357 F-55227 F-55939 F-56003 F-56037 F-56133 G-54537
G-54737 G-54863 G-54865 G-54866 G-54867 G-55075 G-55652
I-54180 I-54656 I-54738 I-54739 I-54740 I-55018 I-55426
I-55677 I-56272 J-54154 J-54156 J-54160 J-54200 J-54388
J-54434 J-54549 J-54560 J-54700 J-54711 J-54900 J-54962
J-55060 J-55196 J-55232 J-55275 J-55504 J-55572 J-55576
J-55607 J-55695 J-55707 J-55710 J-55716 J-55722 J-55787
J-55876 J-55899 J-56104 J-56189 J-56280 J-56324 L-54899
M-54326 M-54327 M-54328 M-54403 M-54423 M-54778
M-54802 M-54803 M-54804 M-55053 M-55510 M-55528
M-55531 M-55535 M-55763 M-55807 M-55808 M-55809

C. CARTOGRAPHY

C-54091

Mullins, J.L., **Global positioning system surveying, aerial photography, and mapping program of the United States in Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.44-45.

The National Science Foundation (NSF), through the U.S. Geological Survey (USGS), supports surveying and mapping in Antarctica. During the 1993-94 season, USGS directed its antarctic surveying and mapping activities toward the acquisition of mapping aerial photography, global positioning system (GPS) geodetic mapping control, topographic and satellite image mapping, seismology, doppler satellite tracking, and the compilation of an antarctic gazetteer. These activities are described.

C-54405

Bridger, J.F.D., **Scottish National Antarctic Expedition's survey of Laurie Island, South Orkneys,** *Scottish geographical magazine,* Sep. 1990, 106(2), p.113-116, 13 refs.

DLC G1.S43

The Scottish National Antarctic Expedition (SNAE) arrived at Laurie I. in late Mar. 1903 but serious mapping did not begin until after mid-winter, starting with a local compass survey. Work with a theodolite commenced in late July but little progress was made before it was brought to a halt by an accident to the instrument in early Sep. From then until Nov., relying mainly on a sextant, the survey was extended over the greater part of the island. The SNAE's manuscript map, while showing virtually all of Laurie Island's coastline in detail, depicts little of the mountainous interior. Triangulation by theodolite was restricted to part of Scotia Bay. The remainder of the island was mapped by a method involving the measurement of one or more additional baselines and the intersection and resection of sextant and compass angles. Comparison of the SNAE's published outline with a recent Landsat-based map of Laurie I. reveals no serious flaws in the survey. (Auth.)

C-54424

Kidder, S.Q., Vonder Haar, T.H., **Meteorological satellite instrumentation,** Satellite meteorology—an introduction, San Diego, Academic Press, Inc., 1995, p.87-144, Refs. p.141-144.

DLC QC879.5.K53

This paper examines the sensor instrumentation of contemporary satellite platforms, including those employed for meteorological surveys of polar regions. Radiometry calibration, specifications and design parameters are presented.

C-54599

Xiao, Y.H., Wang, Q., **Aerophotogrammetric mapping with small format of aerophotos for Zhongshan Station in Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.89-94, In Chinese with English summary. 4 refs.

The principle, method and accuracy for producing 1:5000 topographic maps and their orthophotos, as well as 1:10,000 topographic maps which are based on the 120 type non-metric camera, and 1:40,000 small format aerophotos of the area near Zhongshan Station, are discussed. In cases of increasing the number of control points properly, and adding some suitable weights during the exterior orientation procedure, the maximum point fitting errors are 2.2 m in plane and 1.2 m in elevation. The r.m.s. error of fit between the corresponding topographic map and its orthophoto is 0.14 mm. (Auth. mod.)

C-54600

Chen, C.M., E, D.C., Sang, J.Z., **Geodetic network at Larsemann Hills, Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.95-100, In Chinese with English summary. 4 refs.

A geodetic survey network was established in the Larsemann Hills area in 1988-1992; it covered approximately 177.6 km^2 which were divided into 4 survey sections. Data were processed using the principle of simultaneous adjustment. Statistics and analysis of the adjustment results indicate that the network is well suited to meet the demands of scale 1:10,000-map work.

C-54677

Schwan, H., Wunderle, S., Desnos, Y.L., **Evaluation of speckle-filtered ERS-1 SAR images in Patagonia and Antarctica,** *Earth observation quarterly,* Sep. 1995, No.49, p.17-20, 8 refs.

One of the main characteristics in SAR imagery is the presence of speekle. Basically, speckle noise is by nature a multiplicative type of noise. For the human observer it reduces the ability to resolve fine detail. Therefore, the application of well-suited algorithms is recommended prior to rectification, classification etc. In the past, adaptive noise filters showed their superiority over linear filters since they take the local statistical properties of noisy images into account. This paper presents a modified version of the Gamma MAP filter algorithm (Nerzy et al. 1991) and some applications in geomorphology and glaciology. ERS-1 images were acquired at the O'Higgins receiving station on the Antarctic Peninsula and are evaluated in the frame of the German interdisciplinary research project 'Interaction Ocean-Ice-Atmosphere' sponsored by the German Ministry of Technology and Research. (Auth. mod.)

C-54721

Butt, A.Z., Hastings, J.T., **McMurdo LTER: Developing a geographic information system database,** *Antarctic journal of the United States,* 1994, 29(5), p.244-245, 8 refs.

The LTER requires development of a geographic information system (GIS), both as a data-management approach and as a spatial analysis mechanism. In this article, the authors summarize the work to date in developing a GIS database for the McMurdo LTER. In a companion article (Hastings and Butt), they describe an experimental access system that allows LTER participants to manipulate this GIS database directly from desk-top personal computers. The Taylor Valley GIS incorporates source materials dating from 1973 to the present. All these coverages are treated as referring to a single, unspecified point-in-time. The Taylor Valley GIS is an active database that experiences continual refinements and additions.

C-54722

Hastings, J.T., Butt, A.Z., **McMurdo LTER: Developing a geographic information system access system,** *Antarctic journal of the United States,* 1994, 29(5), p.246-247, 3 refs.

In a companion article (Butt and Hastings), the authors summarize the the work to date in developing a geographic information system (GIS) database for the McMurdo Dry Valleys LTER. In this article, they describe an experimental access system that allows LTER participants to manipulate this GIS database directly from desk-top personal computers.

C-54782

Biasini, A., **Remotely controlled aircraft for antarctic surveys: new exploration technologies** [Velivoli teleguidati per i rilevamenti in Antartide: nuove tecnologie da esplorare], *Ambiente Antartide,* Dec. 1995, No.6, p.57-59, In Italian.

A new remote-controlled aircraft is described, designed to provide more detailed and more accurate, aerial photographs, especially for surveys in Victoria Land, than satellite images currently available. The guidance systems consist essentially of two consoles used by pilots on land for radio control of instruments on board the aircraft. The aircraft length is under 5 m, it weighs around 300 kg, is jet-propelled and can carry up to 50 kg of instruments.

C-54914

Yoshikawa, K., **Construction of the map of main study area,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.47-50.

The area investigated has not been mapped before. Therefore, all the elements which enter into the construction of a map had to be determined in the 1991-1992 season. Astronomical observations and Global Positioning Systems were used to determine the latitude and longitude of the initial station and the azimuth of one of the lines. Triangulation and aerial photos were used to determine the topography. The elevation was determined by measuring atmospheric pressures using a barometer. Topographic maps of the Ellsworth Mountains were used to confirm the elevation and contours. The mapped area is about 30 km^2, on a scale of 1:25,000.

C-54943

Biasini, A., Guglielmin, M., Smiraglia, C., **Aerial photographic survey of the Mt. Melbourne 1x4.5° quadrangle (Victoria Land, Antarctica),** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.43.

During the X Italian expedition in Antarctica (Nov. 1994), a photographic survey by helicopter was carried out. The method and instruments used are described. The photographs will be used to improve geomorphological maps in progress with non-photogrammetric digital techniques.

C-55255

Ballesteros, J., et al, **Geodesic expeditions to the South Shetland Is., 1987-1989** [Las campanas geodésicas 1987-88, 1988-89 en las Shetland del Sur], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.176-179, In Spanish with English summary.

DLC G845.S93

To support hydrographic survey and charting during antarctic 1987-88, 1988-89 campaigns, some geodetic and topographic determination has been made at different points on Deception, Livingston, and Greenwich islands and Paradise Harbor. The geodetic net was determined as a first step, using two-frequency transit receivers. As a second step, absolute and differential surveys were made using high precision, two-frequency, absolute and differential GPS receivers. Results obtained in both geodetic surveys, together with different interferometric lines reduction, are presented. (Auth. mod.)

C-55256

Catalán, M., Berrocoso, M., **GPS observations in 1988-89: austral gravity effects on satellite observations** [Las observaciones GPS en la red antarctica 1988-89. El efecto del campo gravitatorio austral en las observaciones de satelites], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.180-186, In Spanish with English summary.

DLC G845.S93

During the 1987-1988 expedition, geodetic surveys were carried out on Livingston, Deception and Greenwich islands and in Paradise Harbor using two-frequency high-performance TRANSIT and GPS receivers. Tabulated results are presented. The effects of different gravimetric harmonics on satellite orbits are discussed and shown in graphs.

C-55278

Fox, A.J., **Using multiple data sources to enhance photogrammetry for mapping antarctic terrain,** *Polar research,* Dec. 1995, 14(3), p.317-327, 8 refs.

This paper shows, by reference to a new 1:50,000 scale topographic map of part of the Antarctic Peninsula, how merging topographic data from various sources in a GIS environment can make photogrammetric mapping more effective. Information sources used in the map compilation include three types of aerial photography, georeferenced satellite imagery, surveyed points in a control network and satellite image-derived control points. A shape-from-shading algorithm was used to generate contours for snowfields where absence of surface detail prevented photogrammetric contouring. A horizontal and vertical accuracy of better than ±5 m was achieved in orientation of photography covering almost all of the map area. Such small errors have allowed the construction of an accurate large-scale map for an area where previous mapping had been restricted to medium and small scales. (Auth. mod.)

C-55430

Marova, N.A., **Bottom relief of Antarctica and its representation on new bathymetric maps,** *Mapping sciences & remote sensing,* Apr.-June 1995, 32(2), p.134-144, Refs. p.142-144.

A new set of bathymetric maps is compiled based on the summary and analysis of data obtained on the bottom topography of Antarctica. This article focuses on the use of pre-existing bathymetric information in the compilation of the new maps and how the resulting maps represent an improvement in the depiction of the undersea topography of the oceans of the antarctic region. A brief survey of the basic submarine topographic regions of the Antarctic precedes a review of new approaches to terrain representation (e.g., the geomorphologic interpolation method), particularly as they pertain to the portrayal of such features as mid-oceanic ridges, seamounts rising from abyssal plains, and transition zones between the continental slopes and basin floors. (Auth.)

C-55645

Wicks, W.F., **Problems associated with long range EDM operations in Antarctica,** *New Zealand surveyor,* Feb. 1988, 32(272), p.166-173, 15 refs.

It has been shown that with the clear atmosphere in Antarctica, EDM (electro-optic distance measurement) can operate over distances in excess of those quoted by the manufacturer. There are other problems, however, which reduce the range over which EDM can be effectively used. These are the problems of diffraction and diffusion caused by ice particles in the atmosphere, and by the presence of inversion layers. This paper examines the effect of the presence of these phenomena, and suggests field techniques to counter the effects. (Auth.)

C-55650

Wicks, W.F., **Photo-control surveying in the Ross Dependency using satellite techniques,** *New Zealand surveyor,* Aug. 1988, Vol.273, p.267-269.

With the introduction of satellite-based surveying systems many of the traditional methods are being re-examined. A team of surveyors from the United States Geological Survey used satellite technology for fixing photo-control points in Antarctica in 1986. (Auth.)

C-55764

Kosmann, D., Roth, A., Schreier, G., Winter, R., **ERS-1 radar-maps of Germany and the Antarctic Peninsula,** European 'International Space Year' Conference, Munich, Germany, 30 March-4 April 1992: Navigation & mobile communications image processing, GIS & space-assisted mapping. Proceedings, Paris, European Space Agency, 1992, p.321-326, 10 refs.

DLC TL798.N3E97 1992

Although ERS-1 was primarily designed to serve the needs for the oceanographic user community, significant interest has been stated in using SAR image data also for land applications. This is especially true in application areas where the specific imaging physics of SAR will unveil new results and in regions of the globe where SAR can bypass the otherwise bad "viewing" conditions of optical imagers. Within the radar map of the Antarctic Peninsula, the ERS-1 data received at the German Antarctic Receiving Station and processed with a real time processor will be used to geocode and mosaic the data. The real-time 100 m pixel browse images allow fast monitoring of polar ocean and glacier phenomena. The applications performed with the antarctic mosaic data are managed within the ERS-1 PISP (Polar Ice Sheet Proposal) project. (Auth. mod.)

C-55804

Hartl, P., Thiel, K.H., Wu, X., Doake, C., Sievers, J., **Employment of ERS-1 SAR interferometry in Antarctica** [Application de l'interférométrie du SAR d'ERS-1 dans l'Antarctique], *Observation de la Terre. Bulletin trimestriel,* Mar. 1994, No.43, p.1-4, In French.

Synthetic aperture radar (SAR) interferometry is described as a promising technique for polar research. It is used for setting up three-dimensional topographic maps; to detect and observe small changes in topographic models caused by ice movement; to measure surface velocities and the motion of sea water; to determine the grounding lines of the ice cover, and to follow the evolution of surface geophysical parameters. Some possibilities of the technique are discussed, and examples are presented of interferograms worked out from ERS-1 SAR data obtained over Antarctica.

C-55805

Drinkwater, M.R., Long, D.G., Early, D.S., **Enhanced-resolution ERS-1 scatterometer imaging of antarctic ice** [Imagerie des glaces de l'Antarctique au moyen du diffusiomètre d'ERS-1 à résolution améliorée], *Observation de la Terre. Bulletin trimestriel,* Mar. 1994, No.43, p.4-6, In French.

The ERS-1 AMI scatterometer was designed to determine wind speed and direction over the ocean. A new method of image reconstruction allows one to produce enhanced-resolution images (about 14 km), day or night, of areas where there are no SAR data for lack of receiving stations or during periods when the antarctic stations are closed. These images can be used to map the sea-ice dynamics of austral oceans and of the snow and ice areas of the antarctic ice cover.

C-55806

Casacchia, R., Picchiotti, A., Salvatori, R., **Geological investigation in Antarctica using Landsat-TM data,** *Earth observation quarterly,* Oct. 1992, No.39, p.1-4, 7 refs.

Many research programs in Antarctica make systematic use of remote-sensing observations, in particular to monitor those processes relevant to global climatic-change studies. Due to the severe environmental and operating conditions in such an extended region, field surveys are extremely costly and difficult to carry out. It is suggested that remote-sensing techniques may provide the answer. Outstanding data at different spatial resolutions and wavelengths have so far been obtained over this area, and it is concluded that many more will be collected by future missions, especially in the microwave region of the spectrum. (Auth.)

C-55933

Mantripp, D.R., Ridley, J.K., Rapley, C.G., **Antarctic map from the Geosat Radar Altimeter Geodetic Mission,** *Earth observation quarterly,* May-June 1992, Nos.37-38, p.6-10, 20 refs.

A unique view of Antarctica derived from the US Navy's Geosat Radar Altimeter Geodetic Mission is presented. Height measurements gathered during 1985-86 have been used to produce a shadow image for the area of the continent north of 72°S (Geosat's latitude limit). The Geodetic Mission provided a very dense ground-track spacing corresponding to ca. 2 km at the antarctic coastline. In spite of problems with surface tracking, especially on the steeper and more rugged parts of the ice sheet close to the coast, the altimeter obtained some 2,100,000 antarctic height estimates. When compiled as a shadow map, the data reveal considerable topographic detail both on the ice sheet plateaus and on the floating ice shelves. The features visible are of considerable interest for the study of antarctic glaciology, and confirm the value of satellite radar altimeters to antarctic research. The results emphasize the need for altimeter missions with dense ground-track spacings and high-latitude coverage in the future. (Auth.)

C-56028

Van Woert, M.L., Whritner, R.H., Waliser, D.E., Bromwich, D.H., Comiso, J.C., **ARC: a source of multisensor satellite data for polar science,** *EOS,* Feb. 11, 1992, 73(6), p.65 and 75-76, 14 refs.

Under the auspices of the National Science Foundation, the Antarctic Research Center (ARC) was established at Scripps Institution of Oceanography to provide real-time, polar-orbiting satellite data in support of antarctic field studies and to maintain a multisensor satellite data archive for retrospective data analysis. This article describes the ARC and its data collection program and data archive and gives one example of how the complimentary nature of a multisensor satellite data set can be used to enhance the understanding of physical processes in Antarctica.

C-56174

Grushinskiĭ, A.N., Mikhaĭlov, B.O., **Geoid of Antarctica** [Geoid Antarktidy], *Geofizicheskiĭ zhurnal,* 1989, 11(2), p.39-45, In Russian with English summary. 6 refs.

The approximated mean values of gravity anomalies for Antarctica's unexplored areas are estimated in trapezia with sides equal to 300 km. The actual anomalous field in the areas studied and the approximated field in white spots served as basis for constructing the geoid heights and plumb line deviations. The geoid heights agree with those obtained from altimetric SEASAT measurements for the surrounding ocean. Schematic maps of mean anomalies, the geoid heights and plumb line deviations are adduced. (Auth.)

See also:
A-55203 A-55839 E-55121 E-55565 E-55857 E-55942 F-54060 F-54061 F-54062 F-54066 F-54067 F-54298 F-54823 F-54890 F-54909 F-54946 F-54995 F-55107 F-55361 F-55814 F-55815 F-56059 F-56315 F-56338 G-54320 I-54415 I-54448 I-54546 I-54547 I-54791 I-55812 I-55813 J-54307 J-55052 J-55169 J-55254 J-56020

D. EXPEDITIONS

D-54588

Bruce, W.S., **Log of the *Scotia* Expedition, 1902-4,** Edinburgh, Edinburgh University Press, 1992, 306p., Edited by P. Speak. Included are a combined index of people, places, and things, and a Station Log of separate entries consecutively numbered from 1-553. 14 refs.

DLC G850 1902.S3B78 1992

This work recounts the voyage of the *Scotia* to the southern polar regions during the Scottish National Antarctic Expedition, 1902-1904. The science programs were under the direction of the author; the managemant and safety of the vessel were under the command of Captain Thomas Robertson. Pre-sailing arrangements included seeking funding, contacting societies and influential individuals, and assembling a science group. These tasks and a description of the exploration environment of Edinburgh at the turn of the century comprise the prefatory material, followed by Bruce's narrative log which begins Feb. 2, 1902 and continues through Apr. 19, 1904. Generally it describes the recovery of marine biota between the South Orkneys and the northeastern end of Weddell Sea; the recoveries at other South Orkney locations and the trawling in these areas; naming the permanent anchorage at Laurie I. Scotia Bay; erecting Omond House and the Copeland Observatory; the thorough nautical exploration of Laurie I.; the discovery and naming of Coats Land on the Antarctic Continent; and being beset by ice in 71S/18W (approx.), Mar. 15-20, 1904.

D-54724

Passel, C.F., **Ice: the antarctic diary of Charles F. Passel,** Lubbock, TX, Texas Tech University Press, 1995, 401p., Edited by T.H. Baughman.

DLC G850 1939.P38.P38 1995

The diary is one kept by a geologist of the West Base Unit of the expedition under the overall direction of Adm. Richard E. Byrd. It was this expedition which marked the start of big government expeditions when FDR urged that two separate expeditions then being planned be combined into a single effort and funded by the federal government. In addition to the expected accounts of the ability of men, animals, and machines to survive, cope, and function under the grim antarctic climatic regime, there are entries describing stops along the seaways that resemble the beginning of a Cook's Tour of the tropical Pacific. However, once beyond New Zealand ice floes appeared, reality returned, and the Expedition settled down to the business at hand. Adding much to the narrative, Passel's photographs cover numerous aspects of the Expedition, including a sequence of the off-loading in Antarctica of the ill-fated Snow Cruiser.

D-54998

Ageta, Y., **Activities of the summer party of the 36th Japanese Antarctic Research Expedition in 1994-1995,** *Antarctic record,* Nov. 1995, 39(3), p.252-263, In Japanese with English summary.

JARE-36 consisted of 40 wintering members and 16 summer members with one atmospheric chemist from Germany. The icebreaker *Shirase* arrived at Showa Station on Dec. 24, 1994. The cargo of about 1070 t was unloaded by Jan. 12, 1995. Constructions to replace old buildings and facilities at Showa and for a large HF radar system were carried out by Feb. 14. For the Deep Ice Coring Project at Dome Fuji, an oversnow traverse to and from the Dome Fuji Station was performed; the first wintering at the new station was started by 9 members on Jan. 29. Observations on geology, geodesy and biology were carried out around Showa Station, Lützow-Holm Bay and Riiser-Larsen Massif. Observations on physical, chemical and biological oceanography, geomagnetism and others were made on board the *Shirase* from Tokyo via Antarctica to Sydney. (Auth. mod.)

D-55004

Bertram, C., **Antarctica sixty years ago: a re-appraisal of the British Graham Land Expedition 1934-1937,** *Polar record,* Apr. 1996, 32(181), p.98-183, Refs. p.164-165.

A detailed account is given of the British Graham Land Expedition of 1934-1937 based on impressions and memories of one of the participants, with the express intention to give interest and pleasure in the reading as well as perspective. The subsequent careers of the members of the expedition are reviewed in an appendix.

D-55014

Magnificent scientific exploit, *Beijing review,* May 21-27, 1990, 33(21), p.22, 27-30.

DLC DS701.P42

Geologist Qin Dahe is the first Chinese to walk across Antarctica. This article describes how he and five others in an international expeditionary team trekked for seven months across the Antarctic Continent without mechanical aids, an historical first.

D-55362

Aguayo L., A., **INACH's 32nd Antarctic Scientific Expedition** [XXXII Expedición Científica Antártica del INACH], *Boletín Antártico Chileno,* May 1996, 15(1), p.25-30, In Spanish with English summary.

Between Dec. 27, 1995 and Mar. 4, 1996, INACH coordinated 16 research projects, 14 of which were carried out in the field and 2 in the laboratory. All projects are outlined, the activities covering biology, glaciology, geology, cartography, meteorology, atmospheric and terrestrial physics, and oceanography. The study area included the islands of Snow, Livingston, Greenwich, Robert, King George and Deception; the Antarctic Peninsula; parts of the Drake Passage, and Bransfield and Gerlache straits.

D-55589

Sano, M., **Activities of the summer party of the 31st Japanese Antarctic Research Expedition in 1989-1990,** *Antarctic record,* Mar. 1996, 40(1), p.64-82, In Japanese with English summary. 3 refs.

The following scientific activities were carried out during the summer operations of JARE-31, 1989-1990: geological, biological and geodetic observations by helicopter in the Sør Rondane Mountains region; biological and oceanographic observations in the Showa Station area; an oversnow traverse to Mizuho Station from Showa Station for unmanned meteorology and upper atmosphere physics observations; geological, biological, and geodetic surveys on Mt. Pardoe; and meteorological, oceanographic and ionospheric observations and sea magnetometry on board the *Shirase.* (Auth. mod.)

D-55590

Fukuchi, M., Sano, M., **Report of the 33rd Japanese Antarctic Research Expedition: Activities of the summer party (1991-1992) and wintering party (1992),** *Antarctic record,* Mar. 1996, 40(1), p.83-123, In Japanese with English summary. 3 refs.

Summer activities in 1991-92 and winter activities in 1992 of the 33rd Japanese Antarctic Research Expedition (JARE) are described. The scientific research programs covered the following 4 major disciplines: upper atmosphere physics—ground-based observations of disturbance and structures of the magnetosphere, and satellite data acquisition; glaciology and meteorology—glaciological studies including radio echo sounding along the oversnow traverse route to the inland dome area; biology and medical science—sea ice ecology and flux study, ecosystem monitoring and physiological adaptation of man to the antarctic cold, and polar psychological tests; and geology and geophysics—geological field work and geophysical observations. (Auth. mod.)

D-55621

Loewe, F., **History and work of the French Antarctic Expedition to Adélie Land 1948-1952** [Geschichte und Arbeiten der französischen Antarktis-Expedition nach Adélieland 1948 bis 1952], *Naturwissenschaftliche Rundschau,* June 1953, Vol.6, p.231-238, In German. 6 refs.

This essay provides a summary of the work performed during the four year French expedition of 1948-52: programs in geography, geology, ice thickness, biology, seismology and meteorology, and inland explorations by motorized toboggan.

See also:
A-54350 A-54404 A-54435 A-55478 F-55616 F-55617 F-55618
F-55643 H-54875

E. GEOLOGICAL SCIENCES

E-54052

Green, B., **Water, ice & stone: science and memory on the antarctic lakes,** New York, Crown Publishers Inc., 1995, 283p.

DLC GB1798.V53G74 1995

The book offers a very personal account of the author's work as a limnologist and biochemist in the McMurdo Dry Valleys, especially at Lake Vanda and the Onyx River. It derives from more than fourteen months of his journal notes collected over seven antarctic field seasons. There is considerable philosophic reflection stemming from the awe he holds for the antarctic continent. There are also frequent changes of venue between Antarctica, Ohio, and Hawaii. The book does not include an index, maps, nor a list of references.

E-54058

Ivy-Ochs, S., Schlüchter, C., Kubik, P.W., Dittrich-Hannen, B., Beer, J., **Minimum ^{10}Be exposure ages of early Pliocene for the Table Mountain plateau and the Sirius Group at Mount Fleming, Dry Valleys, Antarctica,** *Geology,* Nov. 1995, 23(11), p.1007-1010, 22 refs.

Using accelerator mass spectrometry, ^{10}Be and ^{26}Al in quartz from granites and sandstones from Table Mountain and Mount Fleming were measured. The data show that the plateau surface at Table Mountain had formed by early Pliocene time at the latest. Granites fringing but within the Sirius Group at Table Mountain give a minimum exposure age of 2.6 Ma for this deposit. Two samples from the Sirius Group at Mount Fleming have ^{10}Be concentrations that have reached secular equilibrium. This deposit is at least 4.8 m.y. old. The Sirius Group at Mount Fleming cannot have been deposited after 3.0-2.5 Ma, as implied by biostratigraphic data. These dates contradict the hypothesis that in the Pliocene East Antarctica was deglaciated and the climate was significantly warmer and wetter. The preservation of these surfaces indicates a continuous cold desert in the dry valleys since the beginning of the Pliocene. The high ^{10}Be concentrations the authors measured cannot be reconciled with uplift of the Transantarctic Mountains at a rate of 1 km/m.y. during the past 3 m.y. (Auth. mod.)

E-54059

González-Bonorino, G., Eyles, N., **Inverse relation between ice extent and the late Paleozoic glacial record of Gondwana,** *Geology,* Nov. 1995, 23(11), p.1015-1018, 36 refs.

The late Carboniferous-earliest Permian age estimate (300-280 Ma) for maximum ice volume during late Paleozoic glaciation of Gondwana is challenged. Past estimates assume a direct relation between extent of depositional glacial record and former ice cover; this assumption cannot be sustained, given that the glacial record is composed predominantly of glacially influenced marine strata that accumulated on the margins of ice-covered areas. Gondwana ice cover expanded in the Early Carboniferous in response to polar position, availability of moisture from a mediterranean sea, and epeirogenic uplift of the Gondwana interior. In Namurian time (ca. 325 Ma), Gondwana ice cover attained a maximum extent of about 21 x 10^6 km^2, nearly the area of maximum Pleistocene ice cover. In Stephanian-Asselian time (ca. 285 Ma), ice cover had decreased to about 15 x 10^6 km^2, but glacial marine strata were being deposited and preserved across a very large area of the Gondwana supercontinent. (Auth. mod.)

E-54070

Feldmann, R.M., **Paleobiogeography of Cretaceous and Paleogene decapods from the high southern latitudes,** *Antarctic journal of the United States,* 1994, 29(5), p.1-2, 7 refs.

Examination of fossil decapod crustaceans—crabs and lobsters—and summaries of their occurrences from high southern latitude localities in New Zealand, Antarctica and Chile have established that this southern circum-Pacific region has served as the site of origin of species known to inhabit modern assemblages in deep water and lower latitude areas. To establish the affinities of these organisms with those in Argentina, several exposures of the Cretaceous/Danian Roca Formation in the Neuquén Basin, in west-central Argentina, were visited during May and June 1993. It is found that the Atlantic influence on the distribution of decapod crustaceans was strong in west-central Argentina, at least through the Danian.

E-54071

Rees, M.N., Duebendorfer, E.M., Thorstenson, D.J., **Stratigraphic and structural investigations in the northern Heritage Range, Ellsworth Mountains: evidence for the Ross Orogeny?,** *Antarctic journal of the United States,* 1994, 29(5), p.2-4, 11 refs.

The 1993-94 field season in the northern Heritage Range was the initiation of a 4-year project to collect stratigraphic, structural, geochronological, and geochemical data to evaluate currently conflicting models for the origin (Cambrian) of the Ellsworth-Whitmore Mountains terrane and the timing and kinematics of its accretion to East Antarctica. The structural and stratigraphic fieldwork revealed several features that are evidence for an early Paleozoic deformational event, possibly resulting from the Ross Orogeny. Ongoing paleontologic, microstructural kinematic analysis, and argon-40/argon-39 and uranium/lead geochronologic investigations will constrain more closely the timing and kinematics of this deformational event. If deformation resulted from the Ross Orogeny as the authors suspect, then the structural history of the Ellsworth Mountains is much more similar to that of the Transantarctic Mountains than previously proposed.

E-54072

Dalziel, I.W.D., Helper, M.A., Hutson, F.E., Grimes, S.W., **Geologic investigations in the Shackleton Range and Coats Land nunataks, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.4-6, 14 refs.

Recent global plate reconstructions for the Neoproterozoic suggest that prior to the latest Precambrian to Cambrian amalgamation of Gondwana, the east antarctic craton was the core of an earlier supercontinent, Rondinia, whose break-up gave rise to North America. The authors' research tests this hypothesis by comparing the Precambrian geology of crustal provinces in North America and East Antarctica that the plate reconstructions suggest were once contiguous. The reconstructions start from the premise that two distinct Precambrian crustal provinces of the southwestern United States, the 1.8-1.6 billion-year-old Yavapai-Mazatzal and the 1.3-1.0 billion-year-old Grenville orogens, have equivalents in the Weddell Sea region of the east antarctic craton. Although previous work by British, German, and Russian geologists has identified rocks of the former age range in the Shackleton Range and of the latter in nunataks along the Weddell Sea coast in Coats Land (Bertrab and Littlewood Nunataks), existing data are insufficient to test the hypothesis thoroughly. To facilitate a more detailed comparison, the authors spent 6 weeks during the 1993-94 field season, examining and sampling the rocks of these regions. A major goal of the work at both locations was the collection of well-characterized suites of samples suitable for petrologic, isotopic, and paleomagnetic study.

E-54073

Behrendt, J.C., et al, **How important is late Cenozoic tectonic and volcanic activity in the west antarctic rift system on the dynamics of the west antarctic ice sheet?,** *Antarctic journal of the United States,* 1994, 29(5), p.7-8, 14 refs.

The asymmetric rift system is marked by a 3,000-km long, 4- to 5-km high rift shoulder escarpment which extends along the Transantarctic Mountains from northern Victoria Land to the Horlick Mountains, thence to the Ellsworth Mountains. Behrendt and Cooper (1991) suggested that episodic uplift rates of the order approximately 1 km per million years of the highest sections of the rift shoulder might have a climate-forcing effect on antarctic glaciation; the onset of Late Cenozoic rift activity and antarctic glaciation are approximately coincident. It is suggested that this interpretation is controversial. Seismic-reflection and radar ice-sounding data are interpreted as indicating glacial erosion of volcanic peaks erupted beneath the ice sheet in several places, suggesting this is a general case. Behrendt and Cooper (1991) suggest a possible synergistic relationship between the high uplift rate of the rift shoulder and antarctic glaciation which is generally coincident in Late Cenozoic time.

E-54074

Scherer, R.P., **Speculative stratigraphic model for the central Ross embayment,** *Antarctic journal of the United States,* 1994, 29(5), p.9-11, 21 refs.

Available biostratigraphic, geophysical, and glaciologic data have been compiled and a schematic stratigraphic cross-section along a transect across the Ross embayment has been developed and is shown in figures. The model proposes that a stratigraphic record of episodic marine sedimentation in the west antarctic interior, including a discontinuous Pliocene and Pleistocene marine record, is preserved beneath slow-moving interior ice in the deep basins (for example, the Bentley Trough, which reaches more than 2,500 m below sea level), where glacial erosion has likely been less intense than on the continental shelf.

E-54076

Esser, R., Heizler, M., Kyle, P., McIntosh, W.C., **Argon-40/argon-39 dating of Mount Erebus, Ross Island, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.14-15, 3 refs.

It is argued that previous attempts at dating lavas from Mount Erebus have produced suspicious results. Historically erupted anorthoclase feldspar phenocrysts yielded conventional potassium/argon (K/Ar) dates of over 200,000 years. Because there is no evidence for xenocrystic contamination, the anomalously old ages are attributed to "excess argon" as defined by Dalrymple and Lanphere (1969). In the present study, historically erupted phenocrysts as well as other samples from Mount Erebus previously dated by the K/Ar method were re-dated using the more accurate and precise ^{40}Ar/^{39}Ar dating method. The new age determinations are significantly younger than those previously obtained by the conventional K/Ar method. It is concluded that the evolution and growth of Mount Erebus may have been much faster than previously thought.

E-54078

Malin, M.C., Ravine, M.A., **Thirty years of measurements of sand wedge growth in lower Wright Valley, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.19-20, 3 refs.

Troy Pewe first reported the existence of nonsorted polygons with active sand wedges in the McMurdo Sound region and ice-free valleys. Bob Black, one of the acknowledged U.S. authorities on cold-region periglacial processes first visited the area the year following Pewe's reconnaissance. During the 1960-61, 1961-62, and 1962-63 seasons, Black and his field assistants established 14 sites on Ross I., in the Taylor, Beacon, and Wright Valleys, and at several miscellaneous sites (including Marble Point). The purpose of these sites was to monitor the growth of the sand wedges. Using the data presented in Black (1982) and Berg and Black (1966), the authors computed the average growth rates for wedges at the sites over the period 1982 to 1994. For comparison, they also give the rates from Black.

E-54079

Hall, B.L., Denton, G.H., **Late Wisconsin/Holocene history of the Wilson Piedmont Glacier,** *Antarctic journal of the United States,* 1994, 29(5), p.20-22, 4 refs.

New evidence is presented pertaining to the Late Wisconsin/Holocene history of the Wilson Piedmont Glacier, which is situated in southern Victoria Land beside the critical raised beaches of the Scott Coast. The authors discuss the significance of local glacial geology and suggest that raised beaches along the Scott Coast reflect recession of the Wilson Piedmont Glacier (available radiocarbon dates indicate this recession occurred probably in mid-Holocene time), and therefore may not record the extent or thickness of grounded ice in the Ross Sea at the last glacial maximum.

E-54080

Faure, G., Mensing, T.M., Manson, V.L., Place, M.C., **Geochemistry of a layer of volcanic ash in the ice near Brimstone Peak, southern Victoria Land,** *Antarctic journal of the United States,* 1994, 29(5), p.22-23, 10 refs.

During the 1992-93 field season, a block of ice (27x42x24 cm) containing a dust layer was cut with a chainsaw from an exposure of ice in the valley between Brimstone Peak and Griffin Nunatak. The dust layer (about 2 cm thick) is one of at least three layers that occur at this site at intervals that range from 20 to 164 m. The block of ice was placed inside a new plastic bag and shipped frozen in a rock box to the continental United States for laboratory study. Some of the results are discussed and shown in a figure.

E-54081

Marsh, B.D., Wheelock, M.M., **Vertical variation of composition in the Peneplain and Basement Sills of the McMurdo Dry Valleys: the null hypothesis,** *Antarctic journal of the United States,* 1994, 29(5), p.24-25, 9 refs.

Shown by 2 figures are major-element chemical profiles through both the Peneplain and Basement Sills. Also shown are stratigraphic depictions of the nature of the rock itself. No sign of any production of granitic material that could contribute to the eventual accumulation of continental crust is evident in the central portion of either sill. Only the silicic segregations, formed well within the solidification front, show any marked progression of chemical differentiation. In the context of differentiation by gravitative crystal fractionation, it is concluded that the null hypothesis is supported by these observations.

E-54082

Goodge, J.W., Walker, N.W., Bracchi, K.A., **Geologic investigations in the Lanterman Metamorphic Complex, northern Victoria Land, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.26-27, 4 refs.

The authors are conducting a comparative petrotectonic study of high-grade metamorphic and plutonic rocks of the Nimrod Group in the central Transantarctic Mountains and the Lanterman Metamorphic Complex in northern Victoria Land. These rocks are significant because they constitute some of the few exposures of high-grade basement in the Transantarctic Mountains, and they likely represent remnants of the ancient east antarctic craton. As such, improved documentation of their age, provenance, petrogenesis, and tectonic evolution will help to provide a better understanding of east antarctic cratonal evolution and assembly of the Gondwanaland supercontinent. This article summarizes the fieldwork conducted in the Lanterman Metamorphic Complex during the 1993-94 austral summer field season.

E-54083

Boucher, L.D., Taylor, T.N., Taylor, E.N., **Unusual plant organ from the Triassic of Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.28-29, 11 refs.

As a result of the discovery of silicified plant material at Fremouw Peak several years ago, the Triassic flora of Antarctica today represents the most completely known assemblage of fossil plants providing anatomical detail. The plant remains occur in silicified blocks that are believed to represent levee deposits that were undercut during flooding. Although many floral elements can be placed within major groups of vascular plants, there are several organs for which taxonomic assignment remains problematic. One of these organs is represented by axes that display unusual vascular tissue organization. The larger axis possesses secondary vascular tissue, and the diameter ranges from 1.2 to 2.2 cm. One of the most interesting aspects of the Triassic axis is the anatomical similarity with the Cladoxylales, a group of Devonian plants. Although the Cladoxylales have been included in several taxonomic categories in the past, today most regard them as a type of fern. It is suggested that this interesting axis from the Fremouw Peak site may in fact represent some component of the underground system of a Mesozoic seed fern.

E-54084

Del Fueyo, G.M., Taylor, T.N., Taylor, E.L., Cúneo, N.R., **Triassic seed fern cupules from Antarctica,** *Antarctic journal of the

United States, 1994, 29(5), p.30-31, 10 refs.

Pteridosperms (seed ferns) are an important group of fossil vascular plants that formed a conspicuous element of the Paleozoic flora. The seed fern cupules described in this paper were recovered from two sites: Allan Hills (southern Victoria Land) and Mount Falla (Transantarctic Mountains). Both localities are Triassic and represent the first compression fossils of seed fern cupules that have been recorded from the Mesozoic of Antarctica. The cupules, together with the foliage *Dicroidium* and the pollen organ *Pteruchus,* are believed to represent disarticulated organs belonging to the Corystospermales.

E-54085

Hammer, W.R., Hickerson, W.J., Slaughter, R.W., **Dinosaur assemblage from the Transantarctic Mountains,** *Antarctic journal of the United States,* 1994, 29(5), p.31-33, 6 refs.

The vertebrate assemblage collected during the 1990-91 austral summer from Mount Kirkpatrick in the Beardmore Glacier region of the Central Transantarctic Mountains includes 120-140 bones and 16 teeth representing at least 6 different taxa. The specimens are from the upper Falla Formation and include the partial skull and numerous postcranial elements from a crested theropod dinosaur, *Cryolophosaurus ellioti.* Other specimens in the collection include more fragmentary material from a large plateosaurid prosauropod, at least 2 different scavenging theropods, a (?)dimorphodontid pterosaur, and a large tritylodont. The upper Falla Formation fauna suggests an Early Jurassic (Pliensbachian-Toarcian) age. Diabase intrusions into the upper Falla Formation indicate a minimum age of 177 million years (early Middle Jurassic). A *Dicroidium* flora some 300 m below the bone bed indicates a Late Triassic age for the lower Falla Formation.

E-54086

Hanson, R.E., Elliot, D.H., **Jurassic phreatomagmatic volcanism in the central Transantarctic Mountains,** *Antarctic journal of the United States,* 1994, 29(5), p.33-35, 5 refs.

The upper part of the Gondwana sequence in the Queen Alexandra Range records a transition from deposition in a retroarc foreland basin in the Triassic to explosive basaltic and rhyolitic volcanism in the Jurassic. Explosive volcanism was directly followed by quiet effusion of the Middle Jurassic Kirkpatrick tholeiitic flood basalts; both phases of volcanic activity are interpreted to have occurred in a continental rift environment associated with incipient stages in Gondwanaland breakup. Previous work revealed evidence that the explosive volcanism was phreatomagmatic in nature, involving violent interaction between magma and external water. The present research was initiated during the 1990-91 field season, with the intention of gaining further insight into the nature of this phreatomagmatic volcanism in relation to tectonic setting.

E-54087

Isbell, J.L., Seegers, G.M., Gelhar, G., MacKenzie, P., **Stratigraphy of Upper Carboniferous and Permian rocks exposed between the Byrd and Nimrod Glaciers,** *Antarctic journal of the United States,* 1994, 29(5), p.35-36, 6 refs.

During the austral summers of 1992-93 and 1993-94, Upper Carboniferous and Permian rocks exposed between the heads of the Nimrod and Byrd Glaciers were examined to identify the nature of strata exposed in this region. Rocks of this age were not previously known to exist north of the Starshot Glacier. The area between the Nimrod and Byrd Glaciers was believed to occupy a high which separated strata in southern Victoria Land from strata in the central Transantarctic Mountains. This paper describes the late Paleozoic strata in this region; defines the outcrop belts for rocks in the central Transantarctic Mountains and southern Victoria Land; compares and contrasts strata in the two areas, and defines the extent of the depositional basins for late Paleozoic rocks in the Transantarctic Mountains.

E-54088

Sorkhabi, R.B., Stump, E., **Geodynamic links between the Transantarctic Mountains and Tethys,** *Antarctic journal of the United States,* 1994, 29(5), p.36-38, 14 refs.

In this article, the authors have documented several coeval events in the tectonic evolution of the Transantarctic Mountains and the opening and closing of Paleo- and Neo-Tethys. This is a new perspective on the geological problems of the Transantarctic Mountains because most studies have viewed the Transantarctic Mountains in light of Pacific tectonic evolution. Although the scenario presented here is a first step and needs to be critically assessed and refined, it does point to possible geodynamic links between the Transantarctic Mountain margin of the east antarctic craton and the tectonic history of Tethys through the breakup and northward dispersion of Gondwanaland fragments surrounding Antarctica.

E-54089

Ten Brink, U., Bannister, S., Makovsky, Y., Hackney, R., Katzman, R., **EAST93: Geophysical traverse from the Transantarctic Mountains to Wilkes Basin, East Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.39-41, 4 refs.

The joint U.S.-New Zealand East Antarctic Seismic Traverse (EAST93), carried out during Dec. 1993 and Jan. 1994, was designed to obtain images of the shallow sedimentary layers under the east antarctic ice cap. The traverse started 10 km west of the McMurdo Dome drill site and 25 km west of the exposed bedrock of the Transantarctic Mountains at Lashly Mountains, and ended 323 km west of the drill site over the Wilkes subglacial basin. EAST93 was the first major geophysical traverse on the polar plateau of East Antarctica in 30 years. The experiment combined state-of-the-art seismic methods with other geophysical techniques for the purpose of solving remote geological problems. The experiment was successful in its major logistical objectives—the collection of a long seismic profile in a short field season, reliable operation of the instruments and efficient camp support.

E-54090

Rowell, A.J., Van Schmus, W.R., McKenna, L.W., III, Evans, K.R., **Early Paleozoic continental-rise deposition off East Antarctica: the Patuxent Formation of the Pensacola Mountains,** *Antarctic journal of the United States,* 1994, 29(5), p.42-44, 15 refs.

It is argued that crustal extension and deposition of deep-water turbidites along the margin of East Antarctica were not confined to a period of Neoproterozoic rifting; the authors' new uranium/lead (U/Pb) isotopic dates indicate that at least part of the turbidite succession of the Patuxent Formation in the Pensacola Mountains is Early Paleozoic. These results are consistent with their discovery of marine fossils in limestone olistolith blocks in the formation. It is suggested that much of the Patuxent Formation may represent formerly unknown deep-water deposits that accumulated oceanward of, and contemporaneously with, the Early Paleozoic shelf succession exposed to the east in the Transantarctic Mountains.

E-54092

Harvey, R.P., Schutt, J.W., **Results from the antarctic search for meteorites project, 1993-1994 field season,** *Antarctic journal of the United States,* 1994, 29(5), p.47-48.

The Walcott Névé region has been a prolific source of meteorites for ANSMET (antarctic search for meteorites) field parties, including well-known meteorite sources such as the Lewis Cliff ice tongue and the MacAlpine Hills icefields. A total of 858 meteorites were recovered during the 1993-94 ANSMET season. The vast majority of these are ordinary chondrites and may represent a small number of shower falls rather than a large number of individual falls. The achondrites, carbonaceous chondrites, and metal-rich meteorites recovered should prove to be of significant interest to scientists. A likely source of particular interest is a single recovered meteorite that may be a lunar specimen; the exact nature of this rock cannot be confirmed until initial study of the returned sample has been completed.

E-54093

Lipschutz, M.E., **Meteorite studies: terrestrial and extraterrestrial applications, 1994,** *Antarctic journal of the United States,* 1994, 29(5), p.49-50, 20 refs.

Detailed knowledge of asteroids comes only from studies of their fragments that fall to Earth as meteorites. These planetary materials are studied intensively in terrestrial laboratories, not only to establish their genetic and evolutionary histories and links to particular asteroid classes but also to determine processes that occurred before the Solar System existed and that led to its formation. The research conducted by the author's group involves three techniques: radiochemical neutron activation analysis (RNAA); accelerator mass spectrometry (AMS); and thermodynamic modeling of igneous processes. A newly developed computer analysis program, MELTS, was used to calculate the crystallization sequence of igneous melts. This program was used to demonstrate that a large igneous inclusion in the antarctic chondrite Yamato 794046 was shock-produced. It is planned to apply this technique to Martian meteorites, many of which have been recovered from Antarctica.

E-54094

Rubin, A.E., Kallemeyn, G.W., **Compositional studies of new groups of chondritic meteorites,** *Antarctic journal of the United States,* 1994, 29(5), p.50-51, 8 refs.

Different groups of chondrites have distinct bulk compositions and mineralogical and textural characteristics; researchers infer that each group was derived from a separate asteroid. The large number of meteorite samples discovered in Antarctica in the last 25 years (more than 15,000) has led to the discovery of new chondrite groups. During the last year, the authors analyzed members of two new groups by instrumental neutron activation analysis to determine the concentrations of 27 elements with different geochemical affinities. They combined these data with mineralogical and petrographic studies to characterize the chondrite groups.

E-54095

Benoit, P.H., Roth, J., Sears, H., Sears, D.W.G., **Stability of antarctic blue icefields over the last 300,000 years: meteorites as surface exposure markers,** *Antarctic journal of the United States,* 1994, 29(5), p.51-53, 9 refs.

Bare "blue" icefields are found in the inland portions of the antarctic ice sheet. The ablation of deep ice on these icefields sometimes results in the accumulation of entrained rocks on the ice surface, and the composition of these "moraines" can be indicative of regional iceflow dynamics. Among the rocks in the moraines are sometimes found meteorites; at some icefields, meteorites are the most common type of morainal specimen, with hundreds of meteorite fragments collected on the ice surface. Using the activity of cosmogenic radionuclides, one can determine how long each individual meteorite has been on Earth, that is, its terrestrial age. In this article, the authors discuss the use of thermoluminescence of antarctic meteorites to determine how long individual meteorites have been exposed on the ice surface as opposed to being buried within the ice, that is, a surface exposure age. These data, coupled with terrestrial age data, permit study of the stability of the icefields on which the meteorites were found over the last 500,000 years or so.

E-54111

Fleming, T.H., Foland, K.A., Elliot, D.H., **Isotopic and chemical constraints on the crustal evolution and source signature of Ferrar magmas, north Victoria Land, Antarctica,** *Contributions to mineralogy and petrology,* Sep. 1995, 121(3), p.217-236, Refs. p.233-236.

Isotopic (Nd and Sr) and chemical compositions of the 177 Ma Kirkpatrick Basalt and Ferrar Dolerite from north Victoria Land are examined in order to address the role of crustal assimilation and the characteristics of their mantle source. Results for the Scarab Peak chemical type that constitutes the flow unit capping the lava sequence confirm previous reports that attribute variations in the concentrations of the more mobile elements and calculated initial $^{87}Sr/^{86}Sr$ to mid-Cretaceous alteration and elevated $\delta^{18}O$ to low-temperature interaction with meteoric water. The underlying lavas and the sills that are of the Mt. Fazio chemical type display a much wider range of both chemical and isotopic compositions. The chemical and isotopic similarities, as well as the close geographic correspondence of the Ferrar Group to granitoids produced during the early Paleozoic Ross Orogeny, suggest that in either case Ross-type material may have been involved in the development of the enriched isotopic signature. (Auth. mod.)

E-54144

Birkenmajer, K., **Contemporaneous volcanoes of Bransfield Rift, West Antarctica,** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.299-303, With Polish summary.

The Bransfield Rift is a Cenozoic structure 15-20 km wide within the Bransfield Basin (some 100 km wide) which separates the mainly Mesozoic magmatic arc of the Antarctic Peninsula from the Late Meso-zoic-Cenozoic magmatic arc of the South Shetland Is. Incipient rifting started there at the end of Oligocene, 26 to 22 Ma, and continued at a slow rate through Early Miocene. At that time a system of antithetic faults developed, cutting through Upper Oligocene and older rocks along the outer margin of the rift, which were followed by basaltic to andesitic dyke and plug intrusion in several stages between 22 and 20 Ma, and at 14 Ma. There is a gap in geological evidence for the character of the rift evolution during the Late Miocene through Pliocene stages. (Auth. mod.)

E-54146

Wojtanowicz, J., **Dusty deposits (loesses) of the contemporary arctic zone,** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.463-469, With Polish summary. 28 refs.

A comparative analysis of dusty deposits from Antarctica and the Arctic shows significant differences which are attributed to climatic, geomorphologic and physical conditions of the two regions.

E-54151

Ashley, G.M., Smith, N.D., Goss, M.C., Smith, P.C., **Sedimentation at a subpolar tidewater glacier, Maar Ice Piedmont, Anvers Island, Antarctic Peninsula,** *Antarctic journal of the United States,* 1994, 29(5), p.94-96, 4 refs.

A 2 month intensive study of sedimentation processes was carried out in austral summer 1993-94 near a tidewater portion of the Maar Ice Piedmont in Arthur Harbor. Data consist of conductivity-temperature-turbidity-depth (CTTD) profiles, water samples, and sediment-trap catches to study processes and patterns of sediment dispersal and sedimentation; bottom cores and grabs to document the record of recent glacial marine sedimentation; and video surveys of the ice terminus and the ice-proximal sea bottom with a remotely operated vehicle.

E-54164

Paul, E., Stüwe, K., Teasdale, J., Worley, B., **Structural and metamorphic geology of the Windmill Islands, East Antarctica: field evidence for repeated tectonothermal activity,** *Australian journal of earth sciences,* Oct. 1995, 42(5), p.453-469, Refs. p.468-469.

Structural and metamorphic relationships in the Windmill Is. show evidence for repeated tectonothermal activity. An early metamorphic peak (M_1), characterized by sillimanite-biotite±cordierite assemblages in pelitic rocks, was coeval with and outlasted by D_1 deformation which formed a pervasive horizontal fabric. A major shortening phase (D_2) refolded the M_1/D_2 fabric. The syn- and post-D_2 thermal peak (M_2) occurred at largely static conditions and is characterized by extensive *in situ* partial melting of quartzo-feldspathic units, a high-grade metamorphic overprint of M_1 peak assemblages, and granite and charnockite emplacement. The M_2 overprint increases in intensity from north to south. Pinnitization of early M_1 cordierite and competency relationships between M_1 leuco- and melanosomes during the late stages of D_1 suggest that a cooling phase separates M_1/D_1 and D_2/M_2 into two independent tectonothermal events. The contrast in the relative timing of the structural and metamorphic events during the two cycles indicates they may have formed in two fundamentally different geodynamic environments. (Auth. mod.)

E-54165

Krynauw, J.R., Wilson, A.H., **Evidence for constitutional supercooling from orthopyroxene - pigeonite - plagioclase relations in the Borgmassivet suite of western Dronning Maud Land, Antarctica,** *Mineralogy and petrology,* 1995, 54(1-2), p.119-136, With German summary. Refs. p.134-136.

The Kullen-type sills of western Queen Maud Land are up to 400 m thick and form part of the Meso- to Neoproterozoic Borgmassivet suite. They consist of a Basal, Cumulate, Central and Upper zone. The petrography of the Cumulate zone, with special emphasis on the occurrences at Hammer Heads in the Annandagstoppane area, is described. Microstructures, such as delicate chains of orthopyroxene primocrysts and an increase in grain size of plagioclase chadacrysts from the cores to the margins of postcumulus clinopyroxene oikocrysts, indicate *in situ* crystallization. Composite grains with orthopyroxene at the core, which is mantled in turn by inverted pigeonite, a second generation orthopyroxene and, on the outer margin, clinopyroxene in a reaction relation with the orthopyroxene, are sporadically developed. The relation between the composite structures and plagioclase nucleation and growth is investigated by the study of plagioclase grain size distributions, nucleation density and An compositions of plagioclase cores, which indicate that two periods of plagioclase nucleation occurred. (Auth. mod.)

E-54188

Mao, S., Mohr, B.A.R., **Middle Eocene dinocysts from Bruce Bank (Scotia Sea, Antarctica) and their paleoenvironmental and paleogeographic implications,** *Review of palaeobotany and palynology,* June 1995, 86(3/4), p.235-263, Refs. p.260-262.

An early Middle Eocene dinocyst flora from a piston core from Bruce Bank, South Scotia Ridge, comprises 70 species and subspecies belonging to 34 genera. Such unusual diversity for these high southern latitudes is interpreted to be a reflection of the Eocene climatic optimum. One new species, *Phthanoperidinium antarcticum* Mao and Mohr, *sp. nov.,* is described. High ratios of terrestrial vs. marine kerogen and distribution of the dominant dinocyst species indicate nearshore deposition. The lower part of the section is dominated by peridinoid cyst species of *Deflandrea* and *Phthanoperidinium,* while in the upper part, gonyaulacoid cysts, mainly *Areosphaeridium diktyoplokus,* are the major constituents. This change suggests increasing water depths (from about 800 to 1500 m) in a nearshore to offshore setting. The cyst flora contains 37 species endemic to southern high latitudes and can be assigned to the "transantarctic biogeographic province"; 27 of the cyst taxa are known from temperature areas while 13 thick walled taxa are considered typical for cool to cold water environments. (Auth.)

E-54190

Takahashi, K., Masuda, A., **REE abundances and Rb-Sr systematics for Lunar meteorites: chemical and isotopic characteristics and their genetic implications,** *Geochemical journal,* 1994, 28(2), p.99-113, 22 refs.

Lunar meteorites recovered from Antarctica are recognized to have derived from the lunar highlands. Seventeen samples (rock fragments and clasts) from Yamato-791197 and Yamato-82192 have been analyzed for chemical compositions (rare earth elements and major elements) and Rb-Sr systematics. These samples show chemical and chronological characteristics strongly resembling the lunar highland samples. The lunar highland rocks have been known to show positive Ce anomalies in their REE (rare earth elements) abundance patterns. These anomalies are considered to have formed on the lunar surface, but their genesis has not been determined. The lunar meteorites which the authors analyzed also show the positive Ce anomalies. According to geochemical (major elements and REE abundances) and chronological (Rb-Sr systematics) studies for some lunar meteorites, the Ce anomalies appear to increase with decreasing Al_2O_3 and CaO contents. (Auth. mod.)

E-54234

Brook, E.J., Brown, E.T., Kurz, M.D., Ackert, R.P., Jr., Raisbeck, G.M., Yiou, F., **Constraints on age, erosion, and uplift of Neogene glacial deposits in the Transantarctic Mountains determined from in situ cosmogenic ^{10}Be and ^{26}Al,** *Geology,* Dec. 1995, 23(12), p.1063-1066, 32 refs.

^{10}Be and ^{26}Al data from sandstone boulders in three Neogene glacial deposits in the McMurdo Sound-Dry Valleys region of southern Victoria Land indicate minimum exposure ages of 3 Ma and maximum long-term erosion rates of 5-12 cm/m.y., supporting the suggestion that polar desert conditions have persisted in the Dry Valleys since at least Late Pliocene time. Variation of cosmogenic nuclide production rate with altitude also allows constraints on past uplift rates. Model calculations employing ^{10}Be data indicate little or no uplift in the Dry Valleys region in the past 3 m.y., precluding rapid (1 km/m.y.) Late Pliocene uplift previously suggested for some parts of the Transantarctic Mountains. (Auth.)

E-54235

Behrendt, J.C., Blankenship, D.D., Damaske, D., Cooper, A.K., **Glacial removal of late Cenozoic subglacially emplaced volcanic edifices by the West Antarctic ice sheet,** *Geology,* Dec. 1995, 23(12), p.1111-1114, 15 refs.

Local maxima of the horizontal gradient of pseudogravity from closely spaced aeromagnetic surveys over the Ross Sea, northwestern Ross Ice Shelf, and the West Antarctic ice sheet, reveal a linear magnetic rift fabric and numerous subcircular, high-amplitude anomalies. Some of these volcanic structures penetrate the Neogene sediments beneath the deglaciated continental shelf and are present at the base of the present grounded ice sheet and beneath the ice shelf. Geophysical data indicate two or three youthful volcanic edifices at widely separated areas beneath the sea and ice cover in the West Antarctic rift system. Magnetic models, controlled by marine seismic reflection and radar ice-sounding data, allow the inference that glacial removal of the associated late Cenozoic volcanic edifices (probably debris, comprising pillow breccias and hyaloclastites) has occurred essentially concomitantly with their subglacial eruption. The exposed volcanoes may have been protected from erosion by the surrounding ice sheet because of more competent rock or high elevation above the ice sheet. Glacial removal may be the general case; exposed late Cenozoic volcanic peaks and outcrops, consisting primarily of flows which erupted during antarctic glacial conditions since 30 Ma, may be the exceptions. (Auth. mod.)

E-54237

Bölter, M., Blume, H.P., Erlenkeuser, H., **Pedologic, isotopic and microbiological properties of antarctic soils,** *Polarforschung,* 1995(Pub. 1994), 64(1), p.1-7, With German summary. 41 refs.

Soils from the maritime (Arctowski Station, King George I.) and coastal continental (Casey Station, Wilkes Land) antarctic region are described with respect to pedology, isotopic and microbial environments. They are classified as leptosols, regosols, podzols, and histosols. Only surface layers (1-3 cm) contain sufficient organic material to provide a favorable environment for microbial communities and, further, for accumulations of organic matter. Variability of biological and chemical properties is high on a centimeter scale with depth and in the range of decimeters in horizontal scales. (Auth.)

E-54253

Palmer, A.R., Rowell, A.J., **Early Cambrian trilobites from the Shackleton Limestone of the central Transantarctic Mountains,** *Journal of paleontology,* Nov. 1995, 69(6, Sup.) Part II, The Paleontological Society, Memoir 45, 28p., Refs. p.25-26.

The authors document and describe the trilobite faunas of the Lower Cambrian Shackleton Limestone. The faunas include taxa of Atdabanian, Botomian and possible Toyonian ages and have affinities with those known previously from Gondwana or peri-Gondwana terranes. The geographic distribution of these organisms reveals a large measure of faunal connectedness around the margin of this vast supercontinent in Early Cambrian time. This connectedness extended even to taxa that inhabited shallow-water carbonate shelf environments, because the Shackleton Limestone accumulated in a variety of shallow subtidal and peritidal settings along the ocean-facing margin of the East Antarctic craton, subsequent to a Neoproterozoic rifting event. Although the fossilized Shackleton Limestone fauna is dominated by archaeocyanthans, trilobites are common locally. The remains of 35 trilobite taxa from 32 collecting localities are described. One species, *H. granulosa,* is assigned to the new genus *Holyoakia;* the remaining new species are *Pagetides (Discomesites) spinosus, Lemdadella antarcticae, Kingaspis* (?) *convexus, Yunnanocephalus longioccipitalis,* and *Onchocephalina* (?) *spinosa.* (Auth.)

E-54273

Banfield, L.A., Anderson, J.B., **Glacial-interglacial deposi-**

tional model in Bransfield Basin, Antarctica, *Antarctic journal of the United States,* 1994, 29(5), p.127-128, 14 refs.

Based on approximately 2,600 km of high- and intermediate-resolution seismic data and 100 sediment cores, a detailed seismic facies analysis was conducted in Bransfield Basin. Results of the study include the following: the distribution of the lithologies present in Bransfield Basin seismic facies; a depositional model for Bransfield Basin through past glacial and interglacial periods; and a reconstruction of the extent and thickness of grounded ice during the last significant grounding event in the basin. Seismic facies analysis led to the differentiation of distinct glacial subenvironments: distal glacial marine, proximal glacial marine, grounding zone, subglacial, and acoustic basement.

E-54274

Rodriguez, A.B., Domack, E.W., **Geochemical sedimentological analysis of glacial marine sediments from Palmer Deep Basin, Bellingshausen Sea, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.128-130, 3 refs.

The sediments off the Antarctic Peninsula contain a history of the advance and retreat of glaciers and paleoclimate change. The Palmer Deep Basin is located on the Bellingshausen Sea Continental Shelf, 5 km south of Anvers I. A piston core (PD92-30) was collected from the basin during the R/V *Polar Duke* 92-2 research cruise. This study focuses on the geochemical, magnetic susceptibility (MS), and total organic carbon (TOC) variations in the core. In the Antarctic Peninsula, MS has proved to be a useful paleoclimatic indicator due to distinct sediment source changes that accompany changes in climate. A low MS value corresponds to a high biogenic content and low terrigenous material. High MS values are not found where ice-rafted debris is within the core; therefore, high MS values for core PD92-30 are a product of the fine-grain hemipelagic component of deposition.

E-54275

Bartek, L.R., **NBP93-8 preliminary results of coring and high- and intermediate-resolution seismic surveys of Ross Sea, Antarctica: Improving understanding of linkages between eustatic change and sequence architecture of glaciated continental margins,** *Antarctic journal of the United States,* 1994, 29(5), p.135-136, 4 refs.

During R/V *Nathaniel B. Palmer* cruise 93-8 (NBP93-8), cores and high- and intermediate-resolution seismic data were collected in the Ross Sea to facilitate correlation of the Ross Sea record of ice-volume fluctuation with global records of climate and eustatic change. Preliminary examination of NBP93-8 seismic data reveals that tectonic activity and glacial erosion of the shelf have made much of the Cenozoic section in the region accessible with shallow coring. This situation is providing a means of correlating ages and lithologies to seismic sequences and facies. Early analysis also indicates that the increased survey grid density reveals previously unidentified geographic control in glacial seismic facies variability in the Ross Sea.

E-54276

Shipp, S.S., Anderson, J.B., **High-resolution seismic survey of the Ross Sea continental shelf: implications for ice-sheet retreat behavior,** *Antarctic journal of the United States,* 1994, 29(5), p.137-138, 5 refs.

Approximately 4,100 km of high-resolution seismic data and 45 piston cores and grab samples were collected on the Ross Sea continental shelf. Preliminary analysis of seismic data reveals that the majority of the continental shelf has thin to absent late Pleistocene sedimentary cover. The sediment thickens on the outer shelf, within the troughs, to a maximum of 120 milliseconds. It is suggested that the bank tops in the western Ross Sea probably were the sites of thinner, perhaps stagnant ice. In the eastern Ross Sea, ice probably did not pin on the banks dividing ice streams. Due to its relatively shallower nature, ice in the eastern Ross Sea would have remained grounded longer in the event of sea-level rise.

E-54277

Jahns, E., **Evidence for a fluidized till deposit on the Ross Sea continental shelf,** *Antarctic journal of the United States,* 1994, 29(5), p.139-141, 4 refs.

The petrography of piston cores and grab samples taken in the Ross Sea to determine the nature of the diamicton deposited there was analyzed. The study's objectives were to determine whether or not the diamicton was a fluidized till layer and to use variations in petrographic composition of the diamicton to distinguish between ice-stream provenances. The author suggests that this work supports the hypothesis that sampled portions of the uppermost massive diamicton in the Ross Sea represent the deposition of a sub-ice stream fluidized-till layer.

E-54300

Archangelsky, A., Andreis, R.R., Archangelsky, S., Artabe, A., **Cuticular characters adapted to volcanic stress in a new Cretaceous cycad leaf from Patagonia, Argentina. Considerations on the stratigraphy and depositional history of the Baqueró Formation,** *Review of paleobotany and palynology,* Dec. 1995, 89(3/4), p.213-233, 36 refs.

The cuticle of a new cycad, *Pseudoctenis ornata* Archagelsky et al., sp nov. is described and discussed in relation to the physical paleoenvironment in which the plant lived. The specimens occur in the Early Cretaceous Baqueró Formation, near Estacia El Verano in the Santa Cruz Province, Argentina. A detailed stratigraphic section records four facies, namely (1) fluvial channel, (2) flood plain, (3) lacustrine, and (4) flat and extended plains. A detail of each facies is provided. *Pseudoctenis* cuticles are found in the flood plain facies; the other components of the plant association are *Gleichenites, Araucaria* and *Taeniopteris.* The depositional history of this succession is related to a braided river that periodically received volcanic ash. Plants grew until complete burial by ash. Leaves of *Pseudoctenis* are pinnate, hypostomatic, with polycyclic stomata that form ill-defined rows. Abundant papillae and hair bases are present, especially on the lower cuticle. Comparisons are made with other *Pseudoctenis* species found in the same formation, and in other regions of the world. It is suggested that the paleoenvironment had a strong influence on the vegetation, especially the ash fall, and that it may have played a role in the formation of xeromorphic structures that characterize several gymnosperms present in this stratigraphic unit, including *P. ornata.* (Auth. mod.)

E-54301

Lindström, S., **Early Permian palynostratigraphy of the northern Heimefrontfjella mountain-range, Dronning Maud Land, Antarctica,** *Review of palaeobotany and palynology,* Dec. 1995, 89(3/4), p.359-415, 88 refs.

Permian rocks from five localities in the northern Heimefront Range have been investigated palynologically. Identifiable palynomorphs are present in samples from three of them, namely A and C in Milorgfjella and Lidkvarvet in Sivorgfjella. Eighty palynomorph taxa are recognized and two new combinations are proposed, *Converrucosisporites grandegranulatus* (Anderson) Lindström, comb. nov. and *Cannanoropollis bilateralis* (Tiwari) Lindström, comb. nov. Seventeen taxa are placed in open nomenclature. The assemblages from Locality A and Lidkvarvet are moderately well-preserved, taxonomically diverse, and are indicative of palynofloras deposited in periglacial, cold-climate, freshwater environments. They contain many typical Early Permian Gondwana taxa such as lycopod spores, pterophyte spores, and several species of gymnospermous pollen-grains. The presence of these along with the pterophyte spore *Pseudoreticulatispora confluens* enables correlation with the Late Stage 2 of Australia and equivalents in other Gondwana continents, indicating an Asselian-Tastubian age for these two localities. Assemblages assigned to the *P. confluens* Zone have previously not been encountered within Antarctica. The assemblage from Locality C is poorly preserved with low taxonomic diversity, and contains only one species which is not present in the assemblages from the other two localities, namely *Microbaculispora trisina.* (Auth. mod.)

E-54302

Heusser, C.J., **Palaeoecology of a *Donatia-Astelia* cushion bog, Magellanic Moorland - subantarctic evergreen forest transition, southern Tierra del Fuego, Argentina,** *Review of palaeobotany and palynology,* Dec. 1995, 89(3/4), p.429-440, 52 refs.

Cushion bogs are an integral feature of Magellanic Moorland of subantarctic southernmost Chile. The palaeoecology of an outlying cushion-type bog at Bahia Moat, located in moorland-forest vegetation on the southeastern coast of Argentine Tierra del Fuego, traces the 7000 yr development of the site, local and surrounding vegetational history, and palaeoclimate. Pollen and spore stratigraphy indicates that cushion plants *Donatia* and *Astelia* characterized the bog over the past 2600 yr. Regional vegetation became forest-dominated after 4750 yr BP, following displacement of open communities of Gramineae and Compositae by the evergreens *Nothofagus betuloides* and *Drimys winteri*. Increased precipitation/evaporation ratios in effect during the late Holocene were coupled with lower temperatures, contrasting less humid, moderated conditions with high fire incidence prevailing early in the bog record. (Auth.)

E-54317

Gore, D.B., Pickard, J., Baird, A.S., Webb, J.A., **Glacial Crooked Lake, Vestfold Hills, East Antarctica,** *Polar record,* Jan. 1996, 32(180), p.19-24, 11 refs.

Glacial Krok Lake was an ice-dammed impoundment in Vestfold Hills that had a volume of (250±45) x 10^6 m^3. The impoundment is inferred to have existed during deglaciation following the Late Holocene Chelnok Advance of Sørsdal Glacier. The dam released water incrementally, allowing the formation of four major series of shorelines with a maximum height of 24 m above the current lake level of 22 m asl. Water from Krok Lake overflowed into Watts Lake downstream, allowing salt-water there to mix, dilute, and be transported to the sea via Ellis Rapids. In this way water in Watts Lake became fresh, and alluvial fans consisting of cobbles and boulders formed below Krok Lake and Ellis Rapids. (Auth.)

E-54340

Meneghel, M., Orombelli, G., Smiraglia, C., **Moraines and other formations with buried ice in the Terra Nova Bay area** [Morene e altre forme con ghiaccio sepolto nella regione di Baia Terra Nova (Antartide)], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.261-275, In Italian with English summary. Refs. p.273-274.

DLC G17.S69

In the area of Terra Nova Bay, various landforms linked to buried ice have been identified. Bearing in mind their geomorphological features, the relationships with the surrounding forms and with present glaciers, topography, types of ice and of the covering debris, these forms have been classified as rock glaciers, debris-covered glaciers, ice-cored drifts, and stagnant and ice-cored moraines. (Auth.)

E-54341

Fanucci, F., Firpo, M., Piccazzo, M., **Geological outline of the Ross Sea** [Lineamenti geologici del Mare di Ross: recenti risultati delle ricerche di geologia marina in Antartide], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.277-289, In Italian with English summary. 13 refs.

DLC G17.S69

The geological structure, stratigraphy and origin of the great continental rift forming the Ross Sea are described in the light of most recent studies. The original contribution of Italian investigations of marine geology of the western Ross Sea is emphasized. (Auth.)

E-54343

Baroni, C., **Geomorphology of northern Victoria Land** [Osservazioni sulla geomorfologia della Terra Vittoria settentrionale, Antartide], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.307-311, In Italian with English summary. 15 refs.

DLC G17.S69

Geomorphological elements of northern Victoria Land are characterized as residual ancient morphology, glacial troughs, alpine morphology, eroded coastal reliefs and eroded volcanic structures. (Auth. mod.)

E-54353

Polar Symposium, 16th, Toruń, Poland, Sep. 19-20, 1989, Olszewski, A., ed, **XVI Polar Symposium: Achievements and Prospects of Polish Polar Research, Toruń, Sep. 19-20, 1989** [XVI Sympozjum Polarne: Dorobek i Perspektywy Polskich Badań Polarnych, Toruń, 19-20 września 1989 r.], Toruń, Uniwersytet Mikołaja Kopernika, 1989, 271p., In Polish. Refs. passim. For selected papers see 50-2871 through 50-2934 or A-54354, A-54359, B-54367 through B-54373, E-54355, E-54356, E-54360 through E-54363, F-54357, I-54364 through I-54366, I-54374, M-54358 and M-54375.

DLC G578.S955 1989

In this collection of over 68 papers, 22 deal with the southern polar region. Such topics as the history of Polish antarctic research, geophysics and geology, climatology and glaciology, marine biology, and bioclimatology at Arctowski Station are discussed.

E-54355

Wiśniewski, E., **Bunger Hills—its genesis and some physiogeographical problems** [Oaza Bungera—jej geneza i niektóre problemy fizycznogeograficzne], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.45-50, In Polish.

DLC G578.S955 1989

Several hypotheses on the origin of Bunger Hills, as well as the most plausible one (by American geologist E.T. Apfel), are reviewed. The immediate environment, including the local climate and its effects, is discussed (e.g., strong winds, low humidity). The ice free regions, lakes, ice cliffs, central moraine, and direction of runoff are also described.

E-54356

Guterch, A., **Problems in geodynamic studies of Antarctica** [Problemy badań geodynamicznych Antarktyki], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.50-54, In Polish.

DLC G578.S955 1989

A tectonic-physical model of the earth's crust for passages from the Antarctic Peninsula through the Bransfield Strait, South Shetlands, to the oceanic trench in the Drake Passage is presented. This model was constructed on the basis of results from deep seismic soundings and shallow reflection soundings of the earth's crust, carried out by an expedition from the Polish Academy of Sciences. It is accepted as the standard for one of the main antarctic transects, joining the group of world networks of transects, along which intensive geodynamic research work has been coordinated by the International Committee on Lithospheric Research. (Auth. mod.)

E-54360

Kowalewski, W., Rudowski, S., Zalewski, S.M., **Seismo-acoustic studies in a flooded caldera on Deception Island** [Badania sejsmoakustyczne w zatopionej kalderze wyspy Deception], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.70-75, In Polish. 6 refs.

DLC G578.S955 1989

Studies were carried out in 1984-1985 and 1987-1988, under the auspices of the Geodynamic Expeditions of the Geophysics Institute of the Polish Academy of Sciences and under the leadership of Prof. A. Gutech. The propagation of several main seismo-acoustic units was distinguished at the seafloor of the caldera. Results from this work have provided new data on the formation and development of Deception Island, showing, for example, that some faults are young and active even today. (Auth. mod.)

E-54361

Gaździcki, A., **Geological-paleontological studies of Seymour Island (West Antarctica)** [Badania geologiczno-paleontologiczne wyspy Seymour (Antarktyka Zachodnia)], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.79-81, In Polish. 3 refs.

DLC G578.S955 1989

A history of the research conducted on Seymour I. is presented. The results of joint Argentine-Polish paleontological-sedimentological investigations in the antarctic summer of 1988, yielding previously unknown fauna, are discussed briefly.

E-54362

Rudowski, S., **Geology of the eastern coast of Discovery Bay, Greenwich Island and the South Shetlands** [Geologia wschodnich wybrzeży Discovery Bay, Wyspa Greenwich, Szetlandy Południowe], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.81-82, In Polish.

DLC G578.S955 1989

The exposure of chalky granite intrusion and mountain-chalk tertiary vulcanites (basalt lava, andesites, volcanic aglomerates, tuffs) exposed in southern Guesalaga and along the rocky patch from Ash Point through Angamos and Poisson Hill along the Lopez slope are profiled. (Auth. mod.)

E-54363

Marsz, A.A., **Geomorphology of the shelf of the South Shetland Islands within the limits of Bransfield Strait** [Geomorfologia szelfu Południowych Szetlandów w obrębie Cieśniny Bransfielda], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.91-94, In Polish.

DLC G578.S955 1989

The morphology of the surface of the South Shetlands shelf, from the Bransfield Strait side to the passage from Livingston I. to King George I., as well as elements of the morphology of the adjacent continental slope, are discussed. The relief of the shelf differs fundamentally in morphometric characteristics from the South Shetlands shelf on the side of the Drake Passage. The dominant role in the formation of the shelf relief was played by tectonics, which was responsible for orientation and later glacial erosion. One may assume that the separate geomorphological character of the higher shelf level is connected with the extent of glacial processes (the effect of glacial accumulation?). (Auth. mod.)

E-54380

Rees, P.M., Cleal, C.J., **Marked polymorphism in *Archangelskya furcata,* a pteridospermous frond from the Jurassic of Antarctica,** *Palaeontology,* 1993, Vol.49, p.85-100, Special papers. Refs. p.99-100.

Plant fossils from the Lower Jurassic of Hope Bay which were assigned variously to 6 species belonging to 4 genera are assigned here to a single species, *Archangelskya furcata.* New material from Hope Bay and nearby Botany Bay has provided evidence (in the form of more complete specimens showing intermediate pinnule morphologies and venation patterns) of the existence of a single highly polymorphic species at these localities. The presence of small fronds with dichotomizing principal rachises and of segments of larger fronds with asymmetrical pinnae provides further evidence of a bipartite frond architecture for this species. This, combined with the typically coriaceous nature and obscure venation of the pinnules, suggests that *A. furcata* is pteridospermous. Similar variation in frond architecture and pinnule morphology has been described from Carboniferous floras in the pteridospermous form-genus *Mariopteris;* this has been used here to help interpret the morphology of this antarctic species. (Auth.)

E-54383

Smellie, J.L., Skilling, I.P., **Products of subglacial volcanic eruptions under different ice thicknesses: two examples from Antarctica,** *Sedimentary geology,* 1994, Vol.91, p.115-129, 25 refs.

Late Cenozoic subglacially erupted volcanic sequences are scattered throughout the Antarctic Peninsula. Two of the best preserved examples, at Mount Pinafore and Brown Bluff, are complete enough to be regarded as sequence holotypes for this uncommonly preserved eruptive/depositional setting. Despite a common glacial association, the sedimentary lithofacies in the two outcrops suggest flowing and ponded water conditions, respectively, indicating significant differences in the depositional palaeoenvironments. The original ice thicknesses exerted a major control on the lithofacies which resulted from each eruptive phase. At Mount Pinafore, the lithofacies were confined within a steep-sided valley during successive eruptions beneath thin (100-150 m?), wet-based ice. The much thicker succession at Brown Bluff is a tindar-tuya edifice, which formed within a small basin (probably 15 km across) confined by ice 400 m thick. (Auth.)

E-54394

Panter, K.S., McIntosh, W.C., Smellie, J.L., **Volcanic history of Mount Sidley, a major alkaline volcano in Marie Byrd Land, Antarctica,** *Bulletin of volcanology,* 1994, 56(5), p.361-376, Refs. p.375-376.

Mount Sidley is a complex, polygenetic stratovolcano composed primarily of phonolitic and trachytic lavas and subordinate pyroclastic lithologies at the southern extremity of the Executive Committee Range, a linear chain of volcanoes in central Marie Byrd Land. Detailed field investigation coupled with 14 high precision $^{40}Ar/^{39}Ar$ age determinations reveal a 1.5 million year life span between 5.7 and 4.2 Ma in which three major phonolitic central vent edifices (Byrd, Weiss and Sidley volcanoes) and their calderas were developed (5.7-4.8 Ma). This was followed (4.6-4.5 Ma) by the eruption of trachytic magmas from multiple vent localities further south, and then by small volume benmoreite-mugearite lavas and tephras around 4.4-4.3 Ma at the southern end of Mount Sidley. The final phase of activity was the eruption of basanite cones at approximately 4.2 Ma. The southward migration of volcanic activity was accompanied by distinct changes in magma composition and is best explained by the sequential release of magmas stored within an intricate system of conduits and chambers in the crust by tectonically driven (magma assisted?) fracture propagation. (Auth. mod.)

E-54395

Skilling, I.P., **Evolution of an englacial volcano: Brown Bluff, Antarctica,** *Bulletin of volcanology,* 1994, 56(5), p.573-591, Refs. p.590-591.

Marine shallow-water to emergent volcanoes have been described in detail, but comparable englacial centers are not well documented. Brown Bluff is a Pleistocene, shallow water, alkali basaltic volcano whose deposits were ponded within an englacial lake, enclosed by ice >400 m thick. Its evolution is divided chronologically into pillow volcano, hyalotuff cone, slope failure and hyaloclastite delta/subaerial stages. Seventeen lithofacies and five structural units (A-E) are reognized and described. The pillow volcano stage (Unit A) is similar to those of many submarine seamount volcanoes. Units B and D define the hyalotuff cone stage, which was centered on a summit vent(s). Cone construction was interrupted by drainage of the lake and slope failure of the northeast flank, represented by debris avalanche-type deposits (Unit C). Unit E represents the youngest stage and consists of a Gilbert-type hyaloclastite delta(s). (Auth. mod.)

E-54398

Barling, J., Goldstein, S.L., Nicholls, I.A., **Geochemistry of Heard Island (southern Indian Ocean): characterization of an enriched mantle component and implications for enrichment of the sub-Indian Ocean mantle,** *Journal of petrology,* Aug. 1994, 35(4), p.1017-1053, Refs. p.1046-1050.

This paper details the trace element and isotopic evidence forming the basis of the interpretation by Barling & Goldstein (1990) that the mantle source region of Heard I. contains small quantities of crustal material mixed with a more typical mantle source. First, the evidence which may be used to discriminate between the two possible origins for the continent-derived material, i.e., either as a component in the deep mantle source or as a shallow-level contaminant, is outlined. Second, some complications surrounding the identification of the low-$^{87}Sr/^{86}Sr$ end-member for Heard I. are discussed. Finally, the broader implications for the evolution of oceanic basalt sources beneath the Indian Ocean are evaluated. (Auth. mod.)

E-54399

Hensen, B.J., Zhou, B., Thost, D.E., **Are reaction textures reliable guides to metamorphic histories? Timing constraints from garnet Sm-Nd chronology for 'decompression' textures in granulites from Søstrene Island, Prydz Bay, Antarctica,** *Geological journal,* Dec. 1995, 30(3-4), p.261-271, 30 refs.

Reaction textures are often used to derive pressure-temperature-time (P-T-t) paths for metamorphic rocks. However, because dry rocks in particular react very little unless P-T changes are accompanied by deformation and/or fluid influx, it is possible that mineral assemblages and reaction textures in polycyclic rocks record segments of P-T paths that are unrelated in time. Such a case is documented by garnet Sm-Nd chronology for a mafic granulite with well-developed two-stage garnet breakdown textures from Søstrene I., Prydz Bay. The combined geothermobarometric-geochronological evidence shows that the garnet formed during M_1 at ca. 1000 Ma, ca. 850-900°C and 10 kbar. The garnet breakdown reactions producing symplectites of (1) orthopyroxene and plagioclase and (2) orthopyroxene, plagioclase and spinel occurred, respectively, during post-M_1 decompression and during a second granulite facies metamorphic episode (M_2). The date for the latter event derives from a nearby garnet-sillimanite gneiss and corresponds to garnet ages which provide evidence for a regional granulite episode extending further northeast along Prydz Bay. These data demonstrate that, in the absence of reliable criteria for heating and cooling and without age constraints, reaction textures cannot be assumed to record pressure or temperature changes in a single thermo-tectonic event. (Auth.mod.)

E-54421

Michlovich, E.S., **Cosmogenic radionuclides in meteorites: depth profiles in Canyon Diablo and a temporal variation in H chondrite sources,** West Lafayette, Purdue University, 1994, 142p., AADAA-195 13028, Ph.D. thesis. Refs. p.121-128.

The cosmogenic radionuclides ^{26}Al ($t_{1/2}$=0.71 Myr), ^{10}Be ($t_{1/2}$=1.5 Myr), and ^{36}Cl ($t_{1/2}$=0.30 Myr) have been measured in 12 fragments of the Canyon Diablo meteorite and in 39 antarctic meteorites. Canyon Diablo results have experimentally confirmed theoretical calculations that there is a very significant matrix-dependent component to the build-up and development of the secondary flux of cosmic rays in meteorites. Cosmic-ray exposure ages calculated using these results are about 540 Myr in most cases. Terrestrial ages calculated for antarctic meteorites from ^{36}Cl data are generally <100 kyr. Multivariate statistical analyses of the labile trace elements in 38 antarctic finds and 58 non-antarctic falls, all H chondrites, indicate that meteorites of long (>50 kyr) terrestrial age are the most compositionally distinct from falls. Meanwhile, the antarctic meteorites most recently captured by the Earth are not distinguishable from other (also recently captured) falls. This is strong evidence that the differences seen between antarctic and non-antarctic meteorites are the result of temporal variations in the H chondrite flux to Earth. (Auth.)

E-54439

Potter, P.E., Franca, A.B., Spencer, C.W., Caputo, M.V., **Petroleum in glacially-related sandstones of Gondwana: a review,** *Journal of petroleum geology,* Oct. 1995, 18(4), p.397-420, Refs. p.417-420.

The supercontinent of Gondwana covered more than six times the combined area of the United States and Brazil. In this paper, the petroleum occurrences and potential of glacially-related rocks of Carboniferous-Permian age in this vast area are reviewed in terms of basin types, reservoirs, seals, traps and source rocks. This review indicates that petroleum production in Gondwana's glaciogenic deposits mostly occurs in cratonic and passive margin basins; it occurs wholly in sandstone reservoirs, chiefly in structural traps, and nearly everywhere, reservoirs are sourced by hydrocarbons from non-glaciogenic shales (either older or younger). The only "glacially unique" features of petroleum in Gondwana deposits are its seals of diamictites, which must also be true when one considers the petroleum possibilities of older ancient glacial and glacially-influenced deposits. (Auth. mod.)

E-54456

Mahaney, W.C., **Pleistocene and Holocene glacier thicknesses, transport histories and dynamics inferred from SEM microtextures on quartz particles,** *Boreas,* Dec. 1995, 24(4), p.293-304, 45 refs.

Recent analyses of microtextures on quartz particles (63-2000 μm) from Quaternary tills in Antarctica, Germany, southern Ontario, western Wyoming, Tibet, the Austrian Alps, and Mount Kenya show that glacial fracture and abrasion microfeatures may be used to infer the thickness, transport history and ice dynamics of Pleistocene and Holocene glaciers. Quartz sands emplaced by continental and mountain ice were studied by scanning electron microscopy after transport over various distances in glaciers estimated to range from 150 m to 1500 m thick. Relative differences in ice thicknesses, distances of transport, and/or ice dynamics appear to have determined the frequency of occurrence and type of microtextures occurring on sand-size particles. Subparallel fracture microfeatures tend to increase in frequency over a greater proportion of particle surfaces with increasing ice thickness and distance of transport. Conchoidal fractures, the most typical in quartz, and to some degree crescentic gouges abound on fragments emplaced by continental ice. Other possible fracture and fragmentation mechanisms, producing features of generally glacial origin, involve low velocity impacts induced by stick-slip mechanisms, under variable cryostatic stresses, producing fracturing and abrasion across particle surfaces. Their generation implies high local contact stresses associated with high strain rates. (Auth.)

E-54513

Acosta, J., Herranz, P., Sanz, J.L., Uchupi, E., **Geophysical investigations in Bransfield Strait and the South Shetland Is.** [Investigaciones geofísicas en el estrecho de Bransfield y Shetlands del Sur], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.111-113, In Spanish. 7 refs.

DLC G845.5.J67

This is a review of various geological studies carried out in the Bransfield Strait and the Shetland Is. area, beginning in the early 1980s, covering the evolution of the sea bottom expansion and its contemporary topographic characteristics.

E-54516

Chaar, E., Tassone, A., **Phosphorus contents in sediments of Scotia Bay** [El contenido de fósforo en los sedimentos marinos de la bahía Scotia, Orcadas del Sur], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.125-128, In Spanish. 8 refs.

DLC G845.5.J67

Data on total and extractable phosphorus concentrations, based on analyses of 4 samples of bottom sediments from Scotia Bay, are discussed and presented in tables. It is suggested that the presence of guano from a penguin colony in the vicinity of the Bay may have affected the findings in this study.

E-54519
Bayarsky, A., Concheyro, A., **Geology of Upper Cretaceous samples from Seymour I.** [Mineralogía y micropaleontología de un perfil del Cretácico superior de isla Marambio, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.155-160, In Spanish. 5 refs.

DLC G845.5.J67

Sedimentological analyses of 170 samples of the Upper Cretaceous of the López de Bertodano Formation on Seymour I. were carried out during the 1988-1989 Argentine antarctic expedition; the mineralogical associations are listed. Also reported is a micropaleontological analysis of the samples, with results showing a scarce and poorly diversified nanoflora, characteristic of marine environments.

E-54520
Buatois, L.A., Martinioni, D.R., Lirio, J.M., **Upper Cretaceous trace fossils from the storm-dominated Rabot Formation on James Ross I.** [Trazas fósiles en una plataforma dominada por tormentas, Formación Rabot (Cretácico sup., Punta Rabot, isla James Ross, Antártida)], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.163-166, In Spanish with English summary. 9 refs.

DLC G845.5.J67

Trace fossils are important elements for understanding sedimentary dynamics of the storm-dominated marine shelf represented by the Rabot Formation. Two trace fossil assemblages have been recognized: pre-storm and post-storm assemblages. The former consists of *Palaeophycus, Chondrites, Planolites, Ophiomorpha, Thalassinoides* and *Tisoa*. It represents the activity of suspension and deposit feeders in a low energy environment. *Zoophycos, Rhizocarollium* and rare *Skolithos* make up the latter. It is dominated by feeding structures of deposit feeders. The presence of this low ichnodiversity assemblage suggests recolonization in an unstable setting after storm action. (Auth.)

E-54521
Martínez Macchiavello, J.C., Salas Aramburu, W., **Paleoclimatological evolution from sediment analysis of lakes Hotel, Kitezh and Long** [Evolución paleoclimática a partir del estudio de tres lagos antárticos (Hotel, Kitesch y Long)], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.173-176, In Spanish. 4 refs.

DLC G845.5.J67

The aim of this study was to interpret the climatic evolution on Fildes Peninsula, based on sediment lithology and autoecological data of the diatom taxa found in samples from lakes Hotel, Kitezh and Long. Results lead the authors to conclude that a notable temperature increase, raising the sea level, resulted in the formation of the three lakes, followed by a temperature decrease which lowered the lakes' water level. After that, a moderate thermal increment progressively increased the depth and salinity of lakes Hotel and Kitezh. In Long Lake, the depth of the water decreased while the salinity remained stable.

E-54522
Olivera, A., Concheyro, A., Santillana, S.N., Marenssi, S.A., Rinaldi, C.A., **Paleoecology of the basal section of La Meseta Formation, Seymour I.** [Análisis paleoambiental de la sección basal de la Formación La Meseta (Terciario medio), Isla Marambio, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.177-181, In Spanish. 6 refs.

DLC G845.5.J67

Results of granulometric analyses of 20 samples of sediments from La Meseta Formation on Seymour I. are discussed. Also collected were fossil mollusca, shark teeth, and sponge and plant remains, allowing some paleoecological interpretations and conclusions.

E-54523
Olivero, E., Medina, F., **Cretaceous ammonite biostratigraphy on James Ross I.** [Bioestratigrafía de amonites del Cretácico (Aptiano-Maastrichtiano) de Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.183-187, In Spanish.

DLC G845.5.J67

Preliminary results of investigations on the composition and stratigraphic distribution of Cretaceous ammonite fauna in marine deposits collected along the northeastern shore of James Ross I. are presented.

E-54524
Acevedo, R.D., Caselli, A.T., **MORB events on Laurie I.** [Un episodio efusivo tipo MORB en isla Laurie, Orcadas del sur], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.195-200, In Spanish with English summary. 22 refs.

DLC G845.5.J67

First findings on volcanic rocks from Laurie I. show them to consist of a mid-ocean-ridge basalt, type "P", derived from a primary magma in the upper mantle and emplaced during a subduction process related to the Scotia Arc development from post-Carboniferous to pre-Jurassic times. (Auth. mod.)

E-54525
Acevedo, R.D., Llorente, R.A., **Subvolcanic mesosilicic body at Hope Bay** [El cuerpo subvolcánico mesosilícico de Bahía Esperanza, Península Antártica], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.201-204, In Spanish. 3 refs.

DLC G845.5.J67

The mineralogy and petrographic classification of a subvolcanic body emplaced in the metamorphic sequence of the Trinity Peninsula Formation, and crossing the sandy levels of the Monte Flora Formation near the Esperanza Station, are discussed. Tabulated data are shown.

E-54526
Acevedo, R.D., Llorente, R.A., **Substitution of Si^{IV} by Al^{IV} as indicator of consanguineous eruptive rocks at Hope Bay** [Substitución de Si^{IV} por Al^{IV} como indicador de la consanguinidad de rocas eruptivas en el área de Bahía Esperanza, Península Antártica], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.205-214, In Spanish.

DLC G845.5.J67

Results of chemical analyses and structural formulas of a microgabbro body of small dimensions, crossed by mafic dykes and located in the vicinity of Esperanza Station, are discussed and presented in tables.

E-54527
Buatois, L.A., **Fan-delta deposits and platform in the Hidden Lake Formation, Cretaceous of James Ross I.** [Depósitos de fan-delta y plataforma en la Formación Hidden Lake, Cretácico de la Isla James Ross, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.215-218, In Spanish with English

summary. 5 refs.

DLC G845.5.J67

The Hidden Lake Formation records sedimentation in a fan-delta/shelf setting. The northernmost outcrops of the James Ross I. represent prodelta, front delta, distributary plain and medium fan deposits. Towards the south at Whisky Bay, distal mouth bars and fine-grained sediments deposited from suspension are present. At the southernmost area (Col Obelisco), sedimentologic and ichnologic evidence suggest deposition in a marine shelf. Lateral facies sequence changes are interpreted as radial variations rather than strictly proximal-distal trends. (Auth.)

E-54528
Do Campo, M.D., Haller, M.J., Ostera, H.A., Cagnoni, M.C., Nuñez, H.J., **Geochemistry of the Trinity Peninsula Formation in Botany Bay** [Características geoquímicas de la F. Trinity Península en Bahía Botánica, Península Antártica], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.219-224, In Spanish. 11 refs.

DLC G845.5.J67

Based on new measurements of the illite crystallinity index, it is found that the Trinity Peninsula Formation in the Botany Bay area has metamorphosed within the anchizone rank. Petrographic description and tabulated results of geochemical analysis are presented.

E-54529
Caselli, A.T., Massaferro, G.I., Parica, C., Rinaldi, C.A., **Geochemistry of vulcanites from Seymour and Snow Hill islands** [Geoquímica de las vulcanitas de las islas Marambio y Cerro Nevado, Antártida Argentina], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.225-228, In Spanish. 7 refs.

DLC G845.5.J67

Preliminary results are presented from geochemical analyses of major and minor elements of volcanic rocks from Seymour and Snow Hill islands, which were compared to those from James Ross I. in order to determine and confirm the rocks' origin. The samples were collected during the Argentine Antarctic Expedition in the summer of 1990-1991.

E-54530
Cerredo, M.E., Tassone, A., Llorente, R.A., Del Valle, R.A., **Latest magmatic manifestations of the Antarctic Peninsula Mesozoic arc at Cape Calmette** [Las últimas manifestaciones magmáticas del arco mesozoico de la Península Antártica en Punta Calmette, Bahía Margarita, Península Amtártica], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.233-237, In Spanish. 9 refs.

DLC G845.5.J67

Mesozoic plutonic manifestations of the Antarctic Peninsula show the predominance of granitic rocks over the basal ones; the intrusive magmatism of Cape Calmette is not very different. Texture, color and composition of the rocks are described; tabulated results of chemical analysis are presented. It is suggested that Cape Calmette registers the magmatic manifestations of the last cycle of the Mesozoic arc, characterized by plutonic rocks crossed by a set of basic dykes.

E-54531
Del Valle, R.A., Lirio, J.M., Nuñez, H.J., **Tectonic structure of the Pedersen Nunatak** [Estructura tectónica del nunatak Pedersen (Antártida)], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.239-253, In Spanish. 24 refs.

DLC G845.5.J67

The structural geology of the Pedersen Nunatak as divided into 3 sections, northern, central and southern, is described; 8 geological profiles are shown.

E-54532
Del Río, J.L., Massone, H.E., Martínez, G.A., **Sedimentation of the tombolos on Half Moon I.** [Aspectos sedimentarios de los tómbolos de la isla Media Luna, Islas Shetland del Sur, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.255-258, In Spanish. 4 refs.

DLC G845.5.J67

A study carried out during the summer Argentine antarctic expeditions of 1989-1991 is discussed. Based on granulometric data on form and roundness of psephitic clasts and simple statistical analysis, the textural and compositional characteristics of two Holocene tombolos and the coasts of Half Moon I. are analyzed.

E-54533
Del Valle, R.A., Rinaldi, C.A., **Structural features of the northeastern sector of the Antarctic Peninsula** [Análisis preliminar de los rasgos estructurales del extremo noreste de la Península Antártica], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.261-267, In Spanish. 21 refs.

DLC G845.5.J67

Based on analysis of topographic maps, aerial photography, satellite images, and geological and geophysical data, preliminary results are presented on an attempt to establish structural similarities between the coastal area of eastern Antarctic Peninsula and the northern sector of Patagonia.

E-54534
Martinioni, D.R., **Contribution to the investigations in Rabot Point, James Ross Island, Antarctica,** Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.271-275, 10 refs.

DLC G845.5.J67

Sections cropping out at Rabot Point, included in the Rabot Formation, are described. It is found that the Rabot Formation consists mainly of mudstone and sandstone beds and, in lesser degree, of conglomerate, clay, limestone and tuff beds. Ten different lithofacies are distinguished and are described in detail; distributed in two facies associations, they give the key to the interpretation of sedimentary environments involved in the depositional evolution of the sequence.

E-54535
Masquelin, E.C., Tabó Galli, F., **Welded ash tuffs in the northeastern sector of Fildes Peninsula** [Tobas soldadas en el sector noreste de la Península Fildes, Isla Rey Jorge, Shetland del Sur], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.277-281, In Spanish with English summary. 6 refs.

DLC G845.5.J67

Flow structures, such as gravity folds and convoluted stratifications or surge laminations within a pyroclastic series forming part of the Fildes Peninsula Group, are described, as well as some petrographic features of thin sections of this unit. The existence of welded ash tuffs, of probably intermediate crystallo-clastic composition, is suggested. (Auth. mod.)

E-54536
Ostera, H.A., Cagnoni, M.C., Haller, M.J., Nuñez, H.J., **K-Ar ages of the Cabral Formation on the Antarctic Peninsula** [Edades K-Ar de la Formación Cabral (Grupo volcánico Península Antártica) en su localidad tipo], Segundas Jornadas de

Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.283-288, In Spanish.

DLC G845.5.J67

K-Ar ages obtained of the Cabral Formation are considered to represent the re-aperture age of the system, probably associated with the Lower-Upper Cretaceous magmatism of the area and linked to the hydrothermal activity. The re-aperture displays textural characteristics of the original rocks. From available data, no conclusion was possible regarding the actual age; comparative analysis of the geochemistry of trace elements would suggest its relationship with Upper Jurassic-Lower Cretaceous vulcanism.

E-54538

Petrinovic, I.A., Menegatti, M.D., Risso, C., Aparicio, A., Viramonte, J.G., **Origin and significance of acid magmas on Deception I.** [Origen y significado de magmas ácidos en la Isla Decepción, Islas Shetland del Sur, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.293-295, In Spanish. 4 refs.

DLC G845.5.J67

The volcanic sequences of Deception I. show basically basaltic-andesitic compositions. However, intermediate and acid compositions are also common. These are represented mainly by pumice deposits widely distributed in the Port Foster area. In this study, the emission center of the pumice stones is established and a petrogenic model for them is proposed.

E-54539

Remesal, M.B., Parica, C.A., Salani, F.M., **Petrology of hypabyssal manifestations in South Bay, Livingston I.** [Petrología de las manifestaciones hipabisales del sector de Bahía Sur, isla Livingston, Shetland del Sur], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.297-301, In Spanish. 11 refs.

DLC G845.5.J67

Continuing the studies begun within the Geocronoantar project on South Shetland Is., during the antarctic expedition of Jan.-Mar. 1991 petrological and isotopic investigations of igneous rocks were carried out in the southern sector of Livingston I. On Hurd Peninsula it was found that basic dykes intruding into the folded sediments of Miers Bluff Formation constitute the only magmatic expression of the area.

E-54540

Salani, F.M., Remesal, M.B., Parica, C.A., **Orbicular structures in granitoids of the southwestern sector of False Bay** [Estructuras orbiculares en los granitoides del sector suroccidental de Bahía Falsa, isla Livingston, Shetland del Sur], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.303-307, In Spanish. 9 refs.

DLC G845.5.J67

During the Argentine Antarctic Expedition of 1990-1991, geological surveys were carried on the South Shetland Is.; this paper presents some of the results obtained on Livingston I. The island's geology consists of a Precambrian basement represented by schists of False Bay and Upper Paleozoic, integrated by sedimentary rocks of the Miers Bluff Formation, volcanic and intrusive Jurassic and Cretaceous rocks, crossed by basic dykes attributed to the Tertiary.

E-54541

Scasso, R.A., Bausch, W.M., **Geochemistry and mineralogy of calcareous tufa of the Ameghino Formation and its diagenetic significance** [Geoquimica y caracterización mineralógica de las tobas de la Formación Ameghino (Jurásico superior - Península Antártica). Significado diagenético], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.309-326, In Spanish. 21 refs.

DLC G845.5.J67

Calcareous tufa of the Ameghino Formation (Upper Jurassic - Antarctic Peninsula) constitute intercalations within a marine sequence of pelite and pelite with radiolarians. Their mineralogic and chemical composition, and the analytical methods used, are described. The relationship between the chemical compositions and mineral components is discussed.

E-54542

Santillana, S.N., Marenssi, S.A., Rinaldi, C.A., **Tectonics and initial sedimentation of La Meseta Formation on Seymour I.** [Control tectónico del inicio de la sedimentación de la Formación La Meseta, (Eoceno) Isla Marambio, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.327-330, In Spanish. 6 refs.

DLC G845.5.J67

The Argentine Antarctic Expedition of 1990-1991 continued the geological surveys of the La Meseta Formation on Seymour Island begun in 1986 in the framework of the Geoantar Marambio project. Results and their interpretation are presented, noting that significant tectonic control in the initial stages of sedimentation is found in the first 120 m of deposits, with 3 megabreccias indicating a non-depositional tectonic instability.

E-54543

Silva, A., Rinaldi, C.A., **Preliminary report on the outcrops on western Rabot Point** [Informe preliminar sobre los afloramientos al oeste de Punta Rabot, Isla James Ross, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.331-333, In Spanish. 5 refs.

DLC G845.5.J67

A detailed sedimentological study is reported of Cretaceous outcrops located in western Rabot Point, with determination of lateral variations of the Rabot Formation.

E-54544

Strelin, J., Carrizo, H., López, A., Torielli, C., **Holocene volcanic activity on James Ross Island** [Actividad volcánica holocena en la isla James Ross], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.335-340, In Spanish. 5 refs.

DLC G845.5.J67

During the Argentine Antarctic Expedition of 1990-1991, a series of volcanoes of very recent formation was discovered on the eastern border of James Ross I. Three of these—Eugenia, Marina and Elba—were investigated; their morphology and volcanology are described.

E-54545

Viramonte, J.G., et al, **Petrogenic model for volcanic rocks on Deception I.** [Modelo petrogenético para las rocas volcanicas de la isla Decepción, islas Shetland del Sur, Antártida], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.341-343, In Spanish. 4 refs.

DLC G845.5.J67

Variations of andesitic and basaltic compositions found in the majority of rocks on Deception I. are discussed. A genetic model of volcanic material of the island is proposed, using theoretical models of fractional crystallization based on analysis of the oldest and least evolved rocks.

E-54556

Belluso, E., Lanza, R., **Palaeomagnetic results from the Middle Tertiary Meander Intrusives of northern Victoria Land, East Antarctica,** *Antarctic science,* Mar. 1996, 8(1), p.61-72, Refs. p.71-72.

The Tertiary stocks (Meander Intrusives) cropping out along the coasts of the Ross Sea were sampled for a palaeomagnetic study in northern Victoria Land. Minerals of the magnetite-ulvöspinel series occur in the rocks from all stocks, with low-Ti titanomagnetite usually prevalent. Haematite and goethite occur in small amounts as alteration products. Large secondary components commonly screen the characteristic remanent magnetization and were removed by thermal or AF demagnetization at temperatures or peak-fields higher than 360°C and 20 mT respectively. A total of 10 VGPs were obtained from radiometrically dated rocks (42-22 Ma); the averaged position (69°S, 334°E; α_{95}=9.9°) is the first middle Tertiary palaeomagnetic pole for East Antarctica, and gives evidence for a reversal in the course of the APW path. This evidence is not substantially altered by a supposed tilt-correction consistent with geophysical and geological models for the uplift of the Transantarctic Mountains. No definite conclusion about relative movements between East Antarctica and the Antarctic Peninsula can be drawn from the existing palaeomagnetic data. (Auth.)

E-54557

Gore, D.B., Creagh, D.C., Burgess, J.S., Colhoun, E.A., Spate, A.P., Baird, A.S., **Composition, distribution and origin of surficial salts in the Vestfold Hills, East Antarctica,** *Antarctic science,* Mar. 1996, 8(1), p.73-84, Refs. p.81-82.

A regional chemical boundary termed the 'salt line' in the Vestfold Hills has been investigated using X-ray diffraction and electron probe analyses of surficial salts, and conductivity of surficial sediments. West of the salt line, halite and thenardite are abundant. These salts are derived from dispersal of marine aerosols, saturation of sediment by seawater during postglacial marine transgression, and glacial dispersal of salt-saturated fjord bottom sediments. East of the salt line, subglacial calcium carbonates and salts formed by chemical weathering of their substrates occur. Chemically and morphologically diverse minerals form the weathering products. They include two minerals not found previously in Antarctica, dypingite and hydromagnesite, and the first confirmed occurrence of brushite. (Auth.)

E-54558

Mikhal'skiĭ, E.V., Sheraton, J.W., Laiba, A.A., Beliatskiĭ, B.V., **Geochemistry and origin of Mesoproterozoic metavolcanic rocks from Fisher Massif, Prince Charles Mountains, East Antarctica,** *Antarctic science,* Mar. 1996, 8(1), p.85-104, Refs. p.102-104.

Fisher Massif consists of Mesoproterozoic (c. 1300 Ma) lower amphibolite-facies metavolcanic rocks and associated metasediments, intruded by a variety of subvolcanic and plutonic bodies (gabbro to granite). It differs in both composition and metamorphic grade from the rest of the northern Prince Charles Mountains, which were metamorphosed to granulite facies about 1000 mya. The metavolcanic rocks consist mainly of basalt, but basaltic andesite, andesite, and more felsic rocks (dacite, rhyodacite, and rhyolite) are also common. Most of the basaltic rocks have compositions similar to low-K island arc tholeiites, but some are relatively Nb-rich and more akin to P-MORB. Intermediate to felsic medium-to high-K volcanic rocks, which appear to postdate the basaltic succession, have calc-alkaline affinities and probably include a significant crustal component. From the present data, an active continental margin with associated island arc was the most likely tectonic setting for generation of the Fisher Massif volcanic rocks. (Auth.)

E-54566

Liu, J., Ge, T.M., Duan, W.W., Wu, N.Y., **Paleomagnetism of Early Tertiary volcanics in the South Shetland Islands and its tectonic implications,** *Antarctic research,* Dec. 1995, 6(2), p.18-28, Refs. p.28-29.

A total of 334 oriented volcanic samples from the Early Tertiary were collected for a paleomagnetic study from 43 sampling sites in the South Shetland Is. Paleomagnetic study indicates that the South Shetland Is. and the Antarctic Peninsula were situated in or near their present position in the Early Tertiary. It is also suggested that a counterclockwise rotation of about 15°, related to the relative movement between South America and Antarctica, took place in the northern Antarctic Peninsula since the Paleocene. (Auth.)

E-54576

Willan, R.C.R., Swainbank, I.G., **Galena lead isotopic variations in a Mesozoic-Cenozoic Andean arc, Antarctic Peninsula,** *Journal of the geological society, London,* Sep. 1995, 152(5), p.767-778, 74 refs.

The Antarctic Peninsula magmatic arc was the site of Andean-type subduction from at least Silurian times to the late Cenozoic. Hydrothermal galenas from eight localities in accretionary complex, arc volcanic sequences and plutonic rocks along a strike length of 1100 km have restricted $^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$ compositions plotting on crustal average growth curves. The local geological setting, and comparison with Andean leads, suggest that the major source reservoir was isotopically homogeneous sedimentary rocks forming the late Palaeozoic-Triassic accretionary complex. The lead data suggest that old continental basement is absent at least as far south as 65°S. Galenas from a large epithermal vein system on Hurd Peninsula fall into three populations: the first is a main isotopically homogeneous array interpreted as a large hydrothermal system that extracted homogenous leads from early Triassic turbidites. Two smaller sub-populations, with more radiogenic $^{206}Pb/^{204}Pb$, are associated with mid- to late Cretaceous intrusive rocks, and may represent either local contributions of magmatic lead or younger hydrothermal episodes. (Auth.)

E-54580

Hu, S.L., Zheng, X.S., E, M.L., Birkenmajer, K., **$^{40}Ar/^{39}Ar$ and K-Ar dating of the volcanic rocks from the northern coast of King George Island, West Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(4), p.23-34, In Chinese with English summary. 20 refs.

Volcanic and intrusive rocks from the northern coast of King George I. have been dated with $^{40}Ar/^{39}Ar$ dating technique (K-Ar and laser microarea $^{40}Ar/^{39}Ar$ isochron dating techniques). Systematically dated results show that the volcanic activities in the studied area lasted from Late Cretaceous to the end of the Eocene, with major eruptions occurring in the Eocene. Younger rocks along the northern coast suggest a gradual migration of the volcanic centers on King George I., which corresponds to the regularly distributed time-space pattern of volcanic activities on the South Shetland Is. The intrusive rocks were formed later than the eruptive rocks, which implies that the granodiorite was from the same magma resource as basaltic lava, and underwent differentiation. (Auth. mod.)

E-54581

Lin, Y.T., Wang, D.D., **Inspiration from study of antarctic meteorites. VI. Investigations of Martian meteorites and implications for cosmochemistry,** *Antarctic research (Chinese edition),* 1995, 7(4), p.35-52, In Chinese with English summary. Refs. p.50-52.

Up to 10 Martian meteorites covering 4 petrographic types have been found so far, including 4 meteorites collected in the antarctic area. In this paper, the petrology, mineralogy, bulk chemical composition, isotopic compositions of light elements and noble gases, and chronology of the Martian meteorites are reviewed. In addition, a preliminary discussion on chemical composition of the Martian mantle, Martian magmatism and chemical weathering on the Martian surface, based on the study of Martian meteorites, is presented. (Auth. mod.)

E-54583

Tong, L.X., Liu, X.H., Chen, F.K., Wang, Y.B., Ren, L.D., **U-Pb dating of zircon in the mafic granulite from the Larsemann**

Hills, East Antarctica and its geological implications, *Antarctic research (Chinese edition),* 1995, 7(4), p.65-70, In Chinese with English summary. 13 refs.

The U-Pb isotopic dating of zircon in the mafic granulite derived from mafic cumulate from the Larsemann Hills suggests that a granulite facies metamorphic event earlier than the Pan-African event (500 Ma) possibly occurred in the middle of the Neoproterozoic. The U-Pb discordia of zircon in the mafic granulite are mainly composed of Opx-Cpx-Pl-Qtz and are 772.4+71.1/-48.0 (2σ)Ma. Combining the field evidence, this result possibly represents the earlier mid-pressure granulite facies metamorphic event recognized in this region, which might correspond to the Rodinia event. (Auth. mod.)

E-54589

Duan, W.W., Zhong, H.X., Li, Y., **Glacial-marine sedimentation in Bransfield Strait off northwest Antarctic Peninsula since Late Pleistocene,** *Antarctic research (Chinese edition),* 1995, 7(3), p.1-12, In Chinese with English summary. Refs. p.10-11.

Glaciomarine sedimentary features of Bransfield Strait since Late Pleistocene were inferred based upon variations in lithology, mineral composition, microbiological thanatocoenoses and other geological proxies in a piston core, PC10. The sediments throughout the core (753.5 cm) were dominated by fine-grained clastics with particle diameter less than 0.063 mm, including essentially siliceous ooze and siliceous muddy silt. Material components of the sediment in the core were composed of microbiologic remains, clay minerals, volcanic products and materials of terrigenous origin. The first consisted of almost all siliceous organisms, mostly diatoms and, uncommonly, silicoflagellate, sponge-spicula etc. Among the clay minerals, montmorillonite occurs abundantly; its content was always more than 40%. The terrigenous components included heavy minerals, primarily unsteady associations such as olivine, pyroxene and hornblende, light minerals dominated by feldspars and debris, chiefly basic, volcanics. According to the sedimentogenesis, sediments of the whole prism could be classified as 3 major types: biosiliceous sediment; volcanic detritus; and turbidity sediment. (Auth. mod.)

E-54590

Ren, L.D., Liu, X.H., **Age of the metamorphic event of the garnet-pyroxene granulite from Søstrene Island, Prydz Bay, East Antarctica and its relation to the neighbouring area,** *Antarctic research (Chinese edition),* 1995, 7(3), p.13-17, In Chinese with English summary. 11 refs.

Redetermination of the metamorphic age of a garnet-bearing mafic granulite from the Søstrene Is. has been made and an isochron of whole rock-garnet-pyroxene-plagioclase is obtained, giving an age of 604±28 (2σ) Ma. It is pointed out that this age represents the time of peak granulite facies metamorphism of the area. As to the geological relation of Søstrene Is. with the Bølingen Is. and Larsemann Hills, it is deduced—from rock assemblages, metamorphic superposition and spatial changes and metamorphic age features between the above regions—that the degree of the superposition of the late low pressure metamorphism becomes stronger from west to east. The evolution of the earlier medium pressure to late low pressure probably implies the substages of the same metamorphic cycle. (Auth.)

E-54591

Zheng, X.S., Sàbat, F., Casas, J.M., Pallàs, R., **Volcanic geology of Livingston Island, West Antarctica: a summary,** *Antarctic research (Chinese edition),* 1995, 7(3), p.18-29, In Chinese with English summary. Refs. p.27-29.

The volcanic geology and volcanism of Livingston I. is outlined. The oldest volcanic stratigraphical unit is named Byres Formation, which consists of Late Jurassic to Early Cretaceous basalt, basaltic andesite lava, volcaniclastic, agglomerates and mudstone, siltstone outcropped at Byers Peninsula, the northwest part of Livingston Is. The Mount Bowles Formation of Cretaceous age is altered volcanic strata, outcropped in the central part of Livingston I. and composed largely of andesitic lava with interbedded pyroclastic rocks. Both the interlayered volcaniclastic rock and lava at Hannah Point and the olivine basalt at Cape Shirreff have the same Middle Cretaceous ages. Dolerite is accumulated at Siddons Point, which represents typical products of Late Cretaceous volcanism. Quaternary olivine basalt of Edinburgh Hill Formation occurred in the northern part of the island. (Auth. mod.)

E-54592

Liu, J., Ge, T.M., Duan, W.W., Wu, N.Y., **Palaeomagnetism of Early Tertiary volcanic rocks from South Shetland Islands and its tectonic significance,** *Antarctic research (Chinese edition),* 1995, 7(3), p.30-40, In Chinese with English summary. Refs. p.39-40.

Paleomagnetism, studied in a total of 334 oriented rock samples collected from 43 sites of the South Shetland Is., is discussed. The geological age of whole samples was determined to be Paleocene and Eocene. Results indicate that the South Shetland Is. and the Antarctic Peninsula reached their present geographic position in the Early Tertiary. Paleomagnetic data also suggest that anticlockwise rotation took place on a small scale at the northern margin of the Antarctic Peninsula during the Paleocene-Eocene period. The rotational direction is found to be about 15°, which may be related to movements between the South American and antarctic plates and the opening of Drake Passage. (Auth. mod.)

E-54593

Shi, L., Xie, G.H., **Characteristics of trace elements and genesis of Cenozoic volcanic rocks from Ross Island and Taylor Valley, Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.41-49, In Chinese with English summary. 9 refs.

Systematic studies of trace elements, REE and Sr isotopes of rocks collected from 5 different regions of Ross I. and the Taylor Valley are reported. Ratios of ^{87}Sr/^{86}Sr in all samples range fro 0.703000 to 0.704532. Ratios of Th/Ta and Hf/Sm in volcanic rocks of each region are essentially constant; they can be classified into 2 groups. One group includes samples from Cape Bird, Crater and the southern bank of Bonney Lake; their average ratios of Th/Ta and Hf/Sm are about 1.0773 and 0.8144, respectively. The other group includes samples from Cape Evans and Cape Royds; their average ratios of Th/Ta and Hf/Sm are about 0.1460 and 1.6580. All the features indicate that magma in the study area is almost free from contamination with crustal substance and probably derived from the two different magma sources in the mantle. All the dots of samples on La/Sm-La and Ce/Yb-Ce evince two different trends of magma differentiation, one of which is considered to be a major result of partial melting of equilibrium in the mantle, and the other, a result of magma fractional crystallization. (Auth. mod.)

E-54594

Zhong, H.H., Huang, J.Q., Hu, G.H., Wang, D.D., Yi, W.X., **Preliminary study on the element abundance characteristics in some antarctic meteorites,** *Antarctic research (Chinese edition),* 1995, 7(3), p.50-54, In Chinese with English summary. 6 refs.

The major and trace element compositions in antarctic meteorites have been determined by neutron activation analysis (NAA). The authors investigated the distributional characteristics of these element abundances, and discuss the differences of abundances between antarctic and non-antarctic meteorites. All meteorites are classified according to the results of this work as follows: YY791717(C3), Y74193(H5), ALH76006(H6), ALH77214(L3), Y75271(L5), ALH76001(L6), and ALH76009(L6). (Auth.)

E-54595

Wang, Y.J., Shi, Y.Z., **Fossil homolodromiid crab from King George Island, Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.55-60, In Chinese with English summary. 11 refs.

Homolodromia inflata (Förster) described in this paper was found in the Miocene Cape Melville Formation of the glaciomarine sediments on King George I. Based on comparison between the genera *Homolodromia* and *Antarctidromia* and a discussion on the taxonomic placement of the genus *Homolodromia* in the Brachyura, the authors consider that the genus *Antarctidromia,* previously identified by Förster (1985), may be a synonym of the genus *Homolodromia.* (Auth.)

E-54596

Deng, Z.Q., **Tertiary corals from King George Island, West Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.61-69, In Chinese with English summary. Refs. p.65-66.

The fossil corals described in this paper were collected in the Cape Melville Formation on Melville Peninsula in 1992. They are assigned to *Flabellum rarise ptatum* which were described first by Roniewicz and Morycowa in 1985. The fossil community of genus *Flabellum* was also found on other continents. The coral-bearing formation contains some other fossils, such as bivalves, brachiopods, gastropods, belemnites and crabs. The character of the sediment indicates that this sequence formed in a shallow marine environment, probably a bay. The coral ages are estimated to be Early Miocene. (Auth. mod.)

E-54597

Tang, Y.Q., Lu, B., Sui, L.R., **Characteristics of kerogen in surface sediments from Bransfield Strait, Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.70-80, In Chinese with English summary. 15 refs.

The chemical and physical properties of kerogen in surface sediments from Bransfield Strait were studied by using elementary analyzer, infra-red spectroscopy, electron microscopy and pyrolytic analyzer. The results indicate that the relation between aromaticity and atomic ratio of C/H are linearly dependent. There are large amounts of benzene homologue compounds such as toluene, ethyl benzene, o-xylene and p-xylene. The average content of the total hydrocarbon (S_1+S_2) is $0.89x10^{-3}$. (Auth.)

E-54601

Shang, R.X., Li, D.X., **Research in data structure and standardization of China igneous rock database of Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.101-108, In Chinese with English summary. 9 refs.

China's igneous rock database for Antarctica will consist of eight files: main, source, geology, petrology, essential oxide, REE, trace elements and isotopic files. The eight files will be associated with three fields which are system numbers of rock body, sample and source. The database includes more than 140 fields in which descriptive information and analytical data on igneous rock are stored. Taking into account present conditions of standardization of igneous rock data, the standard vocabulary and codes from IUGS Subcommission on Data Base for Petrology will be used. (Auth. mod.)

E-54603

Sahabi, M., et al, **Morphological reorganization within the Pacific-Antarctic Discordance,** *Earth and planetary science letters,* Jan. 1996, 137(1-4), p.157-173, 40 refs.

Two domains with different satellite gravity signatures appear along the axis and on the adjacent basins of the Pacific-Antarctic Ridge (PAR) between Udintsev FZ and 180°W. One of these signatures is of rough and faulted seafloor, with a high density of apparent, well-marked fracture zones; the other is of smooth seafloor that is comparable with that of oceanic basins that are generally formed at fast-spreading centers. To interpret these features, the authors postulate that the domains with an apparently rough seafloor morphology have been created at a spreading center with an axial valley, and that smooth morphology testifies to a spreading center which was with or evolving into an axial high at the time the crust was formed. This hypothesis demonstrates that, since An 21o time (ca. 48 Ma), the ridge morphology changed from an axial valley to an axial high wherever and whenever the spreading rate exceeded a given threshold value; and that there is no unique threshold value. Geophysical evidence suggests that the differences in observed spreading rate threshold values probably related to upper mantle temperature heterogeneities below the axis of the PAR. (Auth. mod.)

E-54609

Cantrill, D., **Occurrence of the fern *Hausmannia* Dunker (Dipteridaceae) in the Cretaceous of Alexander Island, Antarctica,** *Alcheringa,* Oct. 31, 1995, 19(3), p.243-254, 73 refs.

Hausmannia papilio Feruglio is a widespread component of Albian fossil floras on Alexander I., Antarctic Peninsula. *Hausmannia* cannot be separated from extant *Dipteris* and is best regarded as a foliage form genus of the latter. Palaeoecological reconstructions suggest that *H. papilio* was a stream-side dweller and pioneer species. (Auth.)

E-54612

Shiraishi, K., ed, NIPR Symposium on Antarctic Geosciences, 14th, Tokyo, Oct. 27-28, 1994, **Proceedings of the NIPR Symposium on Antarctic Geosciences, No.8,** Tokyo, National Institute of Polar Research, Oct. 1995, 282p., Refs. passim. For individual papers see E-54618 through E-54628, E-54630 through E-54635, J-54617, L-54613 through L-54616 and L-54629.

This volume contains the proceedings of the 14th Symposium on Antarctic Geosciences held in Tokyo on Oct. 27-28, 1994. It comprises 23 full length papers pertinent to Antarctica, as well as 8 abstracts. The papers cover a wide range of topics on earth sciences. The majority of papers describe the field and observatory work in Lützow-Holm Bay and the Sør Rondane Mountains; a group of studies deals with the links between Antarctica and other continents.

E-54618

Ikeda, Y., Shiraishi, K., Kagami, H., **Geochemical characteristics of mafic dike rocks from the Sør Rondane Mountains, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.49-64, Refs. p.62-64.

Mafic dike rocks (lamprophyre and dolerite) which have been metamorphosed up to amphibolite facies grade intruded Neoproterozoic metamorphic terrains of the Sør Rondane Mountains. Major and trace element abundance and Sr and Nd isotopic compositions were determined on the mafic dike rocks. The lamprophyres are characterized by extremely high K_2O, P_2O_5, Rb, Ba, Sr, Zr, and light rare earth elements which have minette or lamproite affinity. The geochemical characteristics of lamprophyre and dolerite suggest that these mafic rocks were derived from partial melting of a re-enriched mantle source by mixing of remnant subduction-related materials in the Pan-African orogenic time and a metasomatically enriched mantle. It seems likely that these mafic magmatic activities were related to post orogenic igneous activity in a continental collision zone linked to the Pan-African orogeny. (Auth.)

E-54619

Ishizuka, H., Suzuki, S., Kojima, H., **Mineral paragenesis of the sapphirine-bearing rock from the Austkampane area of the Sør Rondane Mountains, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.65-74, 19 refs.

A sapphirine-bearing rock occurs in the Austkampane Hills where sillimanite-garnet-biotite gneisses of the granulite facies are widespread. The constituent minerals of the rock include sapphirine, phlogopite, hydrous cordierite, plagioclase, gedrite, orthopyroxene, spinel, corundum, rutile and ilmenite. The bulk rock analyses show basaltic compositions in a broad sense, but in a strict sense they are enriched in Al_2O_3, MgO, Cr and Ni, suggesting a precursor with troctolitic composition. Among the constituent minerals, it is most characteristic that the sapphirine is not in direct contact with orthopyroxene. This indicates that the reaction sapphirine+orthopyroxene+H_2O = hydrous cordierite-spinel may have occurred. It is suggested that the sapphirine-bearing rock may have undergone nearly isothermal decompression after its peak metamorphism. Such a decompression has recently been reported from other terrains of East Antarctica, suggesting a geological episode common in these terrains. (Auth. mod.)

E-54620

Toyoshima, T., Owada, M., Shiraishi, K., **Structural evolution of metamorphic and intrusive rocks from the central part of the Sør Rondane Mountains, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.75-97, Refs. p.96-97.

Structural evolution of the central part of the Sør Rondane Mountains (SRM) is divided into 7 stages, from D_1 to D_7, based on their characteristics of deformation, metamorphism and igneous activity. The metamorphic history of the central SRM is divided into 3 stages: prograde metamorphic peak stage, retrograde metamorphic stage related to its exhumation, and contact metamorphic stage. The metamorphism of the first 2 stages occurred not only with ductile deformation but also with various kinds of magmatic intrusions. The D_1 stage before the tonalite intrusion corresponds to the prograde metamorphic peak stage. The retrograde metamorphism and exhumation of the lower crustal rocks in the central SRM began at the D_2 stage, closely related to the tonalite intrusion and mylonitization. The D_2-deformation and subsequent D_3-mylonitization were caused by the top-to SW to S and top-to SE displacements, respectively, in extensional tectonic regimes. After these mylonite-forming tectonics, poly-stage folding occurred in compressional tectonic regimes. (Auth. mod.)

E-54621

Oba, T., Shiraishi, K., **Stability field of amphibole from the Sør Rondane Mountains, East Antarctica: implication for the emplacement depth of syenite magma,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.98-106, 19 refs.

By using the stability field of amphibole in melting experiments, the authors attempt to estimate the emplacement depth of amphibole-bearing syenites from the Sør Rondane Mountains. The melting relationships of 4 syenites and one granite were determined in the temperature range of 650-900°C under water pressure of 0.1-0.3 GPa and oxygen fugacities of the FMQ buffer. In 2 syenites and a granite, the maximum pressure stability limit of amphiboles in subliquidus is lower than 0.35 GPa in pressure. The emplacement depth of the syenites from the Sør Rondane Mountains is similar to that of syenites from the Yamato Mountains. (Auth.)

E-54622

Hiroi, Y., Motoyoshi, Y., Shiraishi, K., Ellis, D.J., **Significance of euhedral calcic plagioclase inclusions in garnet from the Lützow-Holm Complex, East Antarctica: a textural indicator of partial melting in pelitic gneisses,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.107-120, Refs. p.118-120.

Calcic, faceted plagioclase inclusions occur commonly within garnet porphyroblasts in upper amphibolite to granulite facies pelitic rocks of the Early Paleozoic Lützow-Holm Complex, East Antarctica, as is also the case in high-grade pelitic metamorphics worldwide. The fact that euhedral plagioclase crystals are only preserved as inclusions in garnet and not in the matrix of these rocks is due to the rigid nature of garnet protecting inclusions from later deformation and recrystallization. The occurrence may have resulted from a partial melting reaction as follows: biotite+sillimanite+sodic plagioclase+K-feldspar+quartz±H_2O = granitic melt+garnet+more calcic plagioclase+ilmenite (or rutile). Thus euhedral plagioclase is a potential indicator of partial melting during high temperature metamorphism. (Auth.)

E-54623

Motoyoshi, Y., Ishikawa, M., Fraser, G.L., **Sapphirine-bearing silica-undersaturated granulites from Forefinger Point, Enderby Land, East Antarctica: evidence for a clockwise *P-T* path?,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.121-129, 12 refs.

Sapphirine-bearing silica-undersaturated granulites from Forefinger Point in Enderby Land preserve a variety of reaction textures suggestive of the prograde segment of the *P-T* evolution followed by nearly isothermal decompression. The granulites are composed of sapphirine, orthopyroxene, cordierite, garnet, spinel, corundum, K-feldspar, biotite and accessory zircon. Petrographical characteristics are: spinel and corundum occur only as inclusions in sapphirine; relict cordierite and biotite are included in the corundum; the sapphirine is locally in direct contact with porphyroblastic garnet, and the garnet is occasionally replaced by symplectitic intergrowth of orthopyroxene+sapphirine+cordierite±biotite. Chemographic relations in the FeO-MgO-Al_2O_3-SiO_2 system (FMAS), textural relations and chemical data indicate a clockwise *P-T* trajectory with marked decompression following peak conditions. (Auth.)

E-54624

Shiraishi, K., Kagami, H., Yanai, K., **Sm-Nd and Rb-Sr isochron ages for meta-trondhjemites from Cape Hinode, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.130-136, 15 refs.

A Rb-Sr and Sm-Nd isotope study of meta-trondhjemites and a pelatic gneiss from Cape Hinode, Lützow-Holm Complex (LHC), has been performed. A Sm-Nd whole rock isochron for 9 meta-trondhjemites defines an age of 1031±69 Ma with an initial $^{143}Nd/^{144}Nd$ ratio of 0.5115520. In the Rb-Sr isochron diagram, the same 9 samples yield an age of 1273±104 Ma with an initial $^{87}Sr/^{86}Sr$ ratio of 0.70275. The Sm-Nd isochron age is indistinguishable from the previously reported U-Pb SHRIMP zircon age (1017±13 Ma). Nd model ages (T_{DM}) of the meta-trondhjemites and a pelitic gneiss are ca. 1.2-1.5 Ga and 2 Ga, respectively. It is concluded that the ca. 1000 Ma age indicates the time of igneous crystallization of the trondhjemite. The pelitic gneiss is the host rock of the trondhjemite intrusion. The ca. 500 Ma high grade metamorphic age is not documented in these rocks. Slight scattering in the Rb-Sr and Sm-Nd isochron diagrams might be the effect of the ca. 500 Ma metamorphism. (Auth. mod.)

E-54625

Fraser, G.L., McDougall, I., **K/Ar and $^{40}Ar/^{39}Ar$ mineral ages across the Lützow-Holm Complex, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.137-159, Refs. p.158-159.

K/Ar and $^{40}Ar/^{39}Ar$ mineral ages are presented for a variety of rock types from several localities across the high-grade Lützow-Holm Complex of East Antarctica. Results indicate that setting of the K/Ar isotopic system took place between ca. 500-450 Ma throughout this terrain. These ages represent the time of cooling and stabilization of the region following Pan African orogenic activity as recorded by U/Pb zircon ages. Despite the broad consistency of ages, the results also indicate a significant variation in timing and rate of cooling between localities within the terrain, with average cooling rates being greater in rocks which experienced higher peak metamorphic conditions. (Auth.)

E-54626

Takigami, Y., Watanabe, T., **^{40}Ar-^{39}Ar geochronological studies of granite rocks from south Victoria Land, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.160-168, Refs. p.167-168.

$^{40}Ar/^{39}Ar$ ages were obtained for two granitic rocks from the Dry Valleys region of south Victoria Land. One sample (biotite-rich fraction) of foliated granitoid gave three age increments of 491 Ma, 502 Ma and 506 Ma, with K/Ca ratios suggesting influence of cooling ages of biotite (younger age) and that of hornblende (older age). Granitoid emplacement is thought to have been before 506 Ma, with cooling from biotite closure temperatures about 490 Ma. A sample of unfoliated granitoid gave ages of 467-496 Ma. The similarity of ages determined for both "pre-tectonic" and "post-tectonic" samples indicate closure of isotopic systems around 490 Ma due to regional uplift/exhumation, rather than actual emplacement ages of individual plutons in south Victoria Land. (Auth.)

E-54627

Niida, K., Yuasa, M., **Peridotites from the seamount off Wilkes Land, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.169-180, Refs. p.179-180.

Dredged peridotite-pyroxenite samples from antarctic Seamount B were examined to clarify the petrological signature. It is suggested from the tectonic setting that the emplacement of the peridotites was achieved by uplifting of upper mantle materials generated as a pre-oceanic rifting at the early stage of continental breakup between Antarctica and Australia. The Seamount B lherzolites contain a large volume of clinopyroxenes (6.5-12.9 modal%) and spinels (2.0-2.9 modal%). The Fo content in olivines ranges between 89.5 and 92.3. The spinels are highly aluminous (Cr#=7.8-15.7). The clinopyroxenes contain high Na_2O (1.24-2.35 wt%) and TiO_2 (0.27 to 0.85 wt%). The modal composition and mineral chemistry suggest that the Seamount B lherzolites display a 'fertile' subcontinental mantle signature ranging from the least to moderately depleted peridotite. (Auth.)

E-54628

Kagami, H., **Topographic character of the east antarctic continental margin off Wilkes Land,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.181-192, Refs. p.191-192.

The canyons off Clarie Coast show a large-scale erosive channel without terraced walls throughout their course. This shape might have been formed by basemental upwarp deformation during the glacial period, and by the ocean basin deepening due to the thermal cooling effect of the lithosphere. In contrast, canyons off Adélie Coast develop predominantly on the continental slope and the upper continental rise, and fade apparently on the lower continental rise. By re-examination of the seismic profiles, it is found that the continental basement forms an arching structure under the continental slope and the upper continental rise off Clarie Coast, which was originally block-faulted during the rifting stage of the continental margin. The arching structure might be formed during addition or subtraction of ice sheet weight, which could be called repeated isostatic rebound at the continental margin since the Pliocene. (Auth.)

E-54629

Ueno, N., **Geomagnetic paleointensity experiment on igneous and metamorphic rocks from Enderby Land in Napier Complex, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.193-200, 13 refs.

The modified Thelliers' and Shaw's methods are applied to granulite and igneous rocks from Mt. Riiser-Larsen in Enderby Land, some of which were dated by the K-Ar method to be of 1.2-1.4 Ga. Very low paleointensities are suggested from high temperature components of the Thelliers-type results and from the Shaw-type experiment. (Auth.)

E-54630

Horii, M., Sakai, H., Arai, K., Nakai, M., Moriwaki, K., **Rock-magnetic analysis of sedimentary sequences for paleo-environmental research,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.201-212, 17 refs.

Rockmagnetic analyses were conducted to examine their utility for paleo-environmental research on the following 3 sedimentary sequences: (1) samples from the Omma Formation of central Japan; (2) cores drilled off the Noosa Heads, Australia; and (3) a core drilled from Honnör Submarine Valley, Antarctica. Sequences (1) and (2) show clear variation of magnetic properties consistent with the changes of depositional environment which correspond to the change of sedimentary circumstances such as Quaternary glacial-interglacial change. Three drilled cores of sequence (2) show high values in magnetic susceptibility during the time range from 14 to 18 ka. The age of sequence (3) is inferred to be beyond the Holocene; however, a preliminary finding of magnetic susceptibility for the core shows no notable variation. (Auth.)

E-54631

Sawagaki, T., **Preliminary report on submarine topography around the Ongul Islands, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.213-218, 7 refs.

Sounding of the sea floor around the Flatvaer Is. was conducted; depth data were newly obtained in the sea area from south to west of Ongul I. North-south trending topographic features dominate in the area west of Ongul I. The Minami-no-seto Strait between Ongul I. and Te I. is composed of three small oval-shaped depressions trending east-west. The submarine landforms newly revealed in this study are generally continuous with the formerly revealed topographies. A bathymetric chart and two kinds of topographic images based on a set of DEM data around the Flatvaer Is. are presented. (Auth.)

E-54632

Igarashi, A., Harada, N., Moriwaki, K., **Marine fossils of 30-40 ka in raised beach deposits, and Late Pleistocene glacial history around Lützow-Holm Bay, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.219-229, Refs. p.228-229.

Radiocarbon ages of fossil marine organisms in raised beach deposits along the Sôya Coast are clearly classified into two groups of 3-8 ka and 33-42 ka by means of Tandetron Accelerator Mass Spectrometry. The older fossils are recognized on the Flatvaer Is. and the northernmost part of Langhovde, which are separated from the present ice sheet margin by a drowned glacial trough below 500 m. Some of the older molluscan fossils as well as the younger ones retain their living form *in situ*. These facts together with the deep continental shelf and a small amount of isostatic uplift of the Holocene raised beaches lead to the following conclusions for the region: marine transgression took place in the last interstadial and in the Holocene; major deglaciation took place by the last interstadial in the region; expansion of the ice sheet during the Last Glacial Maximum was slight; and the sea-level during the last interstadial was probably higher than that estimated from foraminiferal $\delta^{18}O$ records in deep-sea sediments. (Auth.)

E-54633

Takada, M., Hayashi, M., Sawagaki, T., Hirakawa, K., Moriwaki, K., **ESR and TL dating of Quaternary sediments in the Lützow-Holm Bay region, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.230-238, 21 refs.

Fossil shells and marine sediments in the Lützow-Holm Bay region were dated by electron spin resonance (ESR) and thermoluminescence (TL). The ESR and TL dates obtained in this study could be correlated with the postglacial ^{14}C age group around Lützow-Holm Bay. The sample of shells was taken from the emerged marine sediments in Langhovde which also contain another sample of quartz, and there is a small discrepancy between the two dates. Probably this is due to uncertainties in the estimates of the internal dose for the fossil shells and of the paleodose for the quartz sample. (Auth.)

E-54634

Sawagaki, T., **Ground temperature regimes and frost heave activity in the vicinity of Syowa Station, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.239-249, 8 refs.

Ground temperature and frost heave activity were continuously measured during 1992-94 at two sites on East Ongul I. (Site EO) and Cape Hinode (Site CH). The maximum thickness of the active layer was 60-80 cm at Site CH and more than 80 cm at Site EO. Diurnal freeze-thaw layers occurred above 10 cm depth at both sites in summer. In addition, a "zero-curtain" zone appeared below 10 cm depth. Isotherm lines of 0°C suggest that seasonal freezing in late summer at both sites was two-sided, occurring both downward from the ground surface and upward from the permafrost table. Diurnal frost heaves which frequently occurred at Site EO were caused by the diurnal freeze-thaw cycles above 10 cm depth. The maximum heave originated from the growth of the surficial needle ice. Seasonal frost heave amounting to 3 mm was observed at Site EO. This heave seems to have resulted from ice segregation near the permafrost table. (Auth.)

E-54635

Takamatsu, N., Kato, N., Matsumoto, G.I., Torii, T., **Alkali metal constraints on the origin of salts in lakes and ponds from the McMurdo Dry Valleys, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.250-257, Refs. p.256-257.

Alkali metals in lake, pond, and ice samples of the McMurdo Dry Valleys were studied to clarify the origins of dissolved salts and to estimate their evolutional history. The contents of Li, Rb and Cs varied widely, ranging from 0.30 ppb to 390 ppm, 0.06 to 514 ppb and 0.001 to 90.9 ppb, respectively. The low rare alkali metal contents with high Ef_m values of the pond waters and ice samples in the Labyrinth imply that dissolved salts are mainly derived from atmospheric fallout. The decrease of Ef_m values with increasing Cl content of the Labyrinth pond waters suggests that rare alkali metals are removed from waters during freeze and evaporative concentrations. The bottom waters of Lakes Fryxell and Bonney may originate from trapped seawater influenced by water-rock interaction. The extremely high Ef_m values of Don Juan Pond water and the bottom water in Lake Vanda can be explained by the contribution of deep ground waters. (Auth.)

E-54638

BGS launches Falklands oil licensing, *NERC news,* Jan. 1996, No.34, p.6.

In Oct. 1995, British Geological Survey petroleum geologists helped to launch the first oil licensing round for the offshore area around the Falkland Is. Oil companies now have until July 2, 1996 in which to submit bids for licenses in the area.

E-54654

Vogt, T., Corte, A.E., **Secondary precipitates in Pleistocene and present cryogenic environments (Mendoza Precordillera, Argentina, Transbaikalia, Siberia, and Seymour Island, Antarctica),** *Sedimentology,* Feb. 1996, 43(1), p.53-64, Refs. p.62-64.

Secondary precipitates (iron oxide, calcite, etc.) are currently observed in cold-climate Pleistocene deposits. Some have micro- and ultrastructures quite different from precipitates of vadose, phreatic and biogenic origin, and seem to have originated by freezing processes. The microstructures of calcite coatings from a Pleistocene cryopediment in the Mendoza Pre-Cordillera, from a Lower Pleistocene cryogenic slope deposit in Western Transbaikalia and from the present active layer in Antarctica are described. They show similar patterns: fibrous crystals often consisting of piles of platelets, some with internal holes, assembled in millimeter-scale fringes on the lower face of clasts. Observational (mainly fabric) evidence confirms that such peculiar crystals are formed during freezing. The features are unknown in other climates and, when found in past sediments, can be diagnostic of cryogenic palaeoenvironments. (Auth. mod.)

E-54664

Monnier, O., Ménot, R.P., Peucat, J.J., Fanning, M., Giret, A., **Adélie coast revisited: evidence for a Proterozoic tectonic collage** [Actualisation des données géologiques sur Terre Adélie (Antarctique Est): mise en évidence d'un collage tectonique au Protérozoïque], *Académie des sciences, Paris. Comptes rendus. Série II a,* Jan. 4, 1996, 322(1), p.55-62, In French with abridged English version. 21 refs.

Two distinct mesozonal lithotectonic units are defined in Adélie Coast: a western metasedimentary migmatitic unit formed during a Palaeoproterozoic thermal and tectonic event, and an eastern metaigneous unit, which underwent a longer evolution starting during Late Archean time. These units were tectonically joined between 1.7 and 1.5 Ga (basement cratonization). No Pan-African imprint was detected. The previous regional syntheses may be questioned as they assumed a major Late Archean granulite event and the extension of a Pan-African prograde metamorphic gradient. (Auth.)

E-54673

Licht, K.J., Jennings, A.E., Andrews, J.T., Williams, K.M., **Chronology of late Wisconsin ice retreat from the western Ross Sea, Antarctica,** *Geology,* Mar. 1996, 24(3), p.223-226, 25 refs.

Lithologic data from marine sedimentary cores and accelerator mass spectrometer (AMS) radiocarbon dates indicate that grounded ice did not advance to the western Ross Sea continental shelf edge during the last glacial maximum (LGM). A chronology of the timing of ice retreat was provided by 26 AMS dates, obtained from 12 cores. Dates ranging from 20 to 29 ka suggest that the outer continental shelf was not covered by grounded glacial ice prior to and during the early stages of the LGM. ^{14}C dates just above transitions from subglacial diamictons to marine muds indicate that the area around the Drygalski ice tongue was deglaciated by at least 11.5 ka. The Ross Ice Shelf reached its present-day position near Ross I. by about 7 ka. A hiatus of about 15 ka is apparent in radiocarbon dates in cores from the outer continental shelf. The hiatus is interpreted to represent an absence of sedimentation caused by the presence of an ice shelf. (Auth. mod.)

E-54674

Burckle, L.H., Potter, N., Jr., **Pliocene-Pleistocene diatoms in Paleozoic and Mesozoic sedimentary and igneous rocks from Antarctica: a Sirius problem solved,** *Geology,* Mar. 1996, 24(3), p.235-238, 16 refs.

There are two competing scenarios on the behavior of the East Antarctic ice sheet during the late Tertiary. In one scenario, the ice sheet was very dynamic and underwent major drawdown and renewal as late as the Pliocene. In the other, the ice sheet was relatively stable during the late Neogene. The presence of marine diatoms in Sirius Group sedimentary rocks in East Antarctica is at the center of the disagreement. One side regards the diatoms as the major piece of evidence to support the drawdown and renewal hypothesis and infers that they were introduced into the Sirius during renewed glaciation of East Antarctica. Others suggest that these diatoms were likely introduced into the Sirius by atmospheric (largely eolian) processes. This paper proposes a simple test of the eolian hypothesis. If diatoms were introduced into the Sirius by eolian processes, then they should also be present in older (Paleozoic and Mesozoic) sedimentary and igneous rocks. Samples from two units of the Beacon Supergroup (Devonian to Jurassic) from Beacon Valley, East Antarctica, were analyzed. Largely Pliocene-Pleistocene planktonic marine diatoms were found in all sample sets. Because neither Beacon Supergroup sedimentary rocks nor igneous rocks from Marie Byrd Land are Pliocene-Pleistocene in age, such findings strongly suggest that diatoms were introduced into them by eolian processes. (Auth. mod.)

E-54676

Wysoczanski, R.J., Gamble, J.A., Kyle, P.R., Thirlwall, M.F., **Petrology of lower crustal xenoliths from the Executive Committee Range, Marie Byrd Land Volcanic Province, West Antarctica,** *Lithos,* Dec. 1995, 36(3-4), p.185-201, Refs. p.200-201.

Alkaline magmas from the Late Cenozoic Marie Byrd Land Volcanic Province have entrained lithospheric xenoliths which vary from spinel lherzolites to supracrustal rocks. Lower crustal xenoliths have been collected from the Executive Committee Range in central Marie Byrd Land, and their petrological characteristics together with preliminary geochemical data are discussed here. Granulite xenoliths include meta-igneous gabbros and norites with varying proportions of clinopyroxene, spinel and either olivine or orthopyroxene. Pyroxenites occur together with granulites, which on the basis of their similar mineral assemblage, texture, and composition are considered to be related to the granulites. The composition of xenoliths from Mounts Hampton and Sidley differ, defining a major lateral lower crustal discontinuity beneath the Executive Committee Range. Relict igneous textures and low abundances of incompatible elements indicate that the xenoliths initially formed as cumulates rather than as trapped melts. (Auth. mod.)

E-54678

Dante to descend again, *IEEE expert,* Dec. 1993, 8(6), p.72.
DLC QA76.76 E95 I35

Carnegie Mellon University's Robotics Institute will refine and enhance the armature and instrumentation of the robot Dante in preparation for its second descent into the volcanic environment of Antarctica's Mt. Erebus. These modifications are expected to permit the completion of a geochemical sampling mission whose first attempt in Jan. 1993 was aborted when damage to the robot negated its exploratory capacities.

E-54691

Vegas, R., Acosta, J., Uchupi, E., **Continental-oceanic crustal transition in the Bransfield Trough and the South Scotia Ridge (Antarctica); preliminary results,** Rifted ocean-continent boundaries, edited by E. Banda, Dordrecht, Kluwer Academic Publishers, 1995, p.265-289, Refs. p.286-289.

A total of 1,500 km of multichannel seismic reflection profiles recorded aboard B/O *Hesperides* using a seven gun array and a 96 channel streamer during the austral summer of 1991-1992 were used to study 4 structural provinces on the Antarctic and Scotia plates. These provinces, which differ in structural style and crustal character, include: Bransfield Trough, a half-graben in the back of the South Shetland trench/island arc with the master fault on the Antarctic Peninsula side and a chain of volcanic structures along its axis; South Scotia Ridge, a chain of highs and depressions along the boundary between the Scotia and Antarctic plates; the Scotia Sea (this structural province north of the South Scotia Ridge has an oceanic crust); and the Powell Basin, which is located within the Antarctic plate and was formed by back-arc spreading shortly before the collision of a spreading axis with a trench east of Jane Bank about 20 Ma. (Auth. mod.)

E-54714

Powers, L.E., Freckman, D.W., Ho, M.C., Virginia, R.A., **McMurdo LTER: Soil and nematode distribution along an elevational gradient in Taylor Valley, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.228-229, 5 refs.

An elevational transect was established on the south shore of Lake Hoare in Taylor Valley during the 1993-1994 austral summer to examine spatial variation in soils and nematode abundance, moving from young soils at low-mid elevations (83 m and 121 m ASL) to much older soils found at a higher site (188 m ASL). Results suggest that the nematode populations are not limited by soil carbon but may be more influenced by the amount of nitrogen present in the soils. The input and accumulation of organic matter in the soil may not, therefore, be the main predictor of nematode abundance and diversity. Instead, other factors such as soil age, salinity, and moisture may be more important in limiting nematode distribution or may serve to modify the effects of soil carbon and nitrogen.

E-54715

McKnight, D., House, H., Von Guerard, P., **McMurdo LTER: Streamflow measurements in Taylor Valley,** *Antarctic journal of the United States,* 1994, 29(5), p.230-232, 5 refs.

One of the most basic measurements for understanding watershed processes and aquatic ecosystem dynamics is streamflow variation. In the McMurdo Dry Valleys, streamflow measurement is particularly important because of indications that lake levels have been rising rapidly. Presented here are streamflow data for the 1993-1994 austral summer for three streams in Taylor Valley, located in the three lake basins. The data show that the large diel variation is a common feature of the flow regimes of dry valley streams. The major factors controlling the diel variation are considered to be sun angle and the aspect of the glaciers. The timing of initiation of flow between streams also varies greatly, ranging from early Nov. to late Dec. This timing is a characteristic of the source glacier more than the lake basin itself.

E-54717

Doran, P.T., Wharton, R.A., Jr., Spaulding, S.A., Foster, J.S., **McMurdo LTER: Paleolimnology of Taylor Valley, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.234-237, 9 refs.

To study the physicochemical and biological state of past lakes in the region, short cores collected from Lake Hoare have been analyzed for character and amount of carbonates and organic matter, siliceous algal remains, geochemistry, mineralogy, and texture. Preliminary results suggest that solution/dissolution of calcium carbonate is an important process in the lake; carbon dynamics have not been stable over recent time; and organic matter is primarily derived from allochthonous input during periods of high sedimentation rates, while during low sedimentation periods, autochthonous organic input is dominant.

E-54718

Welch, K., et al, **McMurdo LTER: Inorganic geochemical studies with special reference to calcium carbonate dynamics,** *Antarctic journal of the United States,* 1994, 29(5), p.237-239, 12 refs.

During the first field season (1993-1994) of the McMurdo Dry Valleys LTER program, the authors collected, processed, and analyzed samples for geochemical and biogeochemical analysis. Each of the three major lakes in Taylor Valley (Bonney, Fryxell, and Hoare) were sampled at least three times during the field season. A table summarizes the Ca:Cl and Ca:HCO_3 ratios for snow, other southern Victoria Land streams, and some of the LTER recent data from streams contributing to Lake Hoare. All data indicate that Lake Fryxell, and perhaps the west lobe of Lake Bonney, will have $CaCO_3$ dynamics dominated by biological activity, whereas the other two lakes, especially Lake Hoare, may not.

E-54747

Sheraton, J.W., Tindle, A.G., Tingey, R.J., **Geochemistry, origin, and tectonic setting of granitic rocks of the Prince Charles Mountains, Antarctica,** *AGSO journal of Australian geology and geophysics,* Mar. 1996, 16(3), p.345-370, 108 refs.

Granitic rocks in different terranes and of different ages in the Prince Charles Mountains (PCM) show systematic compositional differences. Archaean granitic basement rocks of the southern PCM have compositions unlike those of typical Archaean tonalite-tronhjemite-granodiorite (TTG) terranes and consist mainly of within-plate types, which probably post-date crust formation and early metamorphic events. Unusually HFSE-rich (Zr, Nb, and Y) hornblende-biotite granite gneiss with A-type (anorogenic) affinities was probably derived by fractionation of mafic magma, but other granites represent intracrustal melts. Orthopyroxene-bearing tonalitic to granitic orthogneiss of the *c.* 1000 Ma high-grade terrane in the northern PCM and adjacent areas includes a large proportion of Y-depleted, Sr-undepleted volcanic arc granitoids, probably derived by melting of a plagioclase-poor mafic source (e.g. amphibolite or eclogite) in a Palaeo- or Mesoproterozoic Andean-type plate margin. Tonalite-granodiorite and mafic to felsic metavolcanic rocks at Fisher Massif also formed in an active continental margin, with an associated island arc, about 1300 m.y.a. (Auth. mod.)

E-54748

Kirby, M.E., **High resolution seismic stratigraphy and sedimentological analysis of Holocene glacial marine sediments in the Palmer Deep Basin, Bellingshausen Sea, Antarctica,** Clinton, Hamilton college, 1993, 60p., Ph.D. thesis. Refs. p.58-60.

The Palmer Deep is located along the West coast of the Antarctic Peninsula on the Bellingshausen Sea continental shelf, 5 km south of Anvers I. The focus of this report is the analysis and interpretation of the bathymetry, HUNTEC high resolution seismic profiles, and 4 piston cores. Multiple tests were performed on these cores revealing a correlative magnetic susceptibility shift (ms) and lithologic change at about mid-core. Similar transitions were observed in other tests, including % biogenic silica, $CaCO_3$, C^{14} (sedimentation rates) and smear slide examination of quartz/diatom ratio. In addition, the HUNTEC seismic profiles show acoustic reflectors at depths corresponding to these sedimentary horizons. Mud turbidite sequences are observed in the cores from the deepest basin of the Palmer Deep. The presence of 5 turbidite sequences in a core dating back 5000 years at maximum suggests low frequency but high energy events are responsible for initiating these deposits. Large storms, iceberg groundings and tsunami events are considered as possible trigger mechanisms. (Auth. mod.)

E-54749

Antarctic Meteorite Working Group, **Antarctic meteorite newsletter, Vol.19, No.1, Feb. 1996,** Houston, NASA Johnson Space Center, 1996, 21p.

This newsletter presents classifications for 400 meteorites from the 1994 ANSMET collection and 6 meteorites that have been reclassified. The new meteorites include 381 equilibrated ordinary chondrites, 4 unequilibrated ordinary chondrites, 1 anomalous chondrite, 4 enstatite chondrites, 7 carbonaceous chondrites, 1 achondrite, 1 stony iron and 1 iron. It also includes chondrite reclassification. Petrographic descriptions are given. Tabulated data include a list of newly classified antarctic meteorites, newly classified specimens listed by type, tentative pairings for new specimens, and natural thermoluminescence (NTL) data for antarctic meteorites.

E-54751

Birkenmajer, K., **Cape Melville Formation (Lower Miocene glacio-marine deposits) on King George Island, South Shetland Islands (West Antarctica): its basal and top strata,** *Polish Academy of Sciences. Bulletin. Earth sciences,* 1995, 43(2), p.113-122, 24 refs.

A discontinuous conglomerate bed 1-2 m thick occurs at the base of glaciomarine strata of the Cape Melville Formation. At the northern headland of Cape Melville, this conglomerate represents a fossil beach deposit consisting of well-rounded, cobble-size rock fragments, mainly alien to King George I. They are interpreted as erratic morainic material deposited at the shore by stranded icebergs and rounded by surf wave action at the onset of the Early Miocene Melville Glaciation.

E-54752

Birkenmajer, K., **Glacier retreat and raised marine beaches at Three Sisters Point, King George Island (South Shetland Islands, West Antarctica),** *Polish Academy of Sciences. Bulletin. Earth sciences,* 1995, 43(2), p.135-141, 15 refs.

Raised marine beaches at Three Sisters Point occur at the following altitudes: 45, 40, 35, 30, 25, and 20 m a.s.l. Based on comparison with radiocarbon-dated raised beaches at Admiralty Bay and Maxwell Bay on King George I., they represent a nearly continuous succession of isostatically uplifted marine shorelines of Middle to Late Holocene age. The glacier advanced over the raised beaches (45-20 m) down to sea level, probably during the 18th century, based on comparison with lichenometrically-dated maximum glacier advance at Lions Rump, King George Bay. The glacier front retreated considerably between 1980 and 1994, exposing raised marine beaches and new bedrock sites that were still covered by ice in 1979. (Auth.)

E-54760

Taylor, E.L., **Enigmatic gymnosperms? Structurally preserved Permian and Triassic seed ferns from Antarctica,** *Review of palaeobotany and palynology,* Feb. 1996, 90(3), p.303-318, 63 refs.

Representative organs from the seed fern groups Glossopteridales and Corystospermales were commonly found in Gondwana during the Permian and Triassic, respectively. To date, both groups have been reconstructed predominantly on the basis of compression fossils and, in the case of the glossopterids, impressions. As a result, many details of their morphology remain unclear, and their taxonomic status and relationship to other groups are somewhat enigmatic. Collections of anatomically preserved fossils from permineralized peat in the central Transantarctic Mountains include a number of organs assignable to these two orders. Anatomical characters provide an opportunity to correlate isolated plant organs and to develop new reconstructions of these plants. Combined with paleoecological data, these fossils are beginning to provide a more accurate picture of the habitat and life history of these unique seed plants. (Auth.)

E-54764

Motoyoshi, Y., Shiraishi, K., Asami, M., **Explanatory text of geological map of the northern Yamato Mountains, Antarctica: (2) Mt. Torimai,** *Tokyo. National Institute of Polar Research. Antarctic geological map series,* Mar. 1995, Sheet 27, 8p. + 6 plates + map, Refs. p.7-8.

A geological map of the northern Yamato Mountains, including Mt. Torimai, is presented on a 1:25,000 scale, with location diagrams and legend for stratigraphic and geomorphological data. The general geology of the area, geochemistry and mineralogy of the rocks, geologic structure and conditions of metamorphism and plutonism are discussed in the accompanying text. Tabulated data are included.

E-54767

Shevenell, A.E., **Record of Holocene paleoclimate change along the Antarctic Peninsula: evidence from glacial marine sediments, Lallemand Fjord,** Clinton, N.Y., Hamilton College, Apr. 1996, 46p. + tables, Contribution to research experience for undergraduates: Office of Polar Programs, National Science Foundation (Earth sciences). Refs. p.42-45.

Sedimentologic and geochemical analyses of a 5.5 m long, high resolution sediment gravity core were collected in Lallemand Fjord. Three distinct sedimentologic units believed to reflect distinct paleonvironments in the fjord were recognized. Deglaciation of Lallemand Fjord is believed to have occurred prior to ^{14}C 8,000 year BP, followed by a period of open marine conditions with variable sea ice extent (variable T.O.C. content) between 8,000 and 2,700 ^{14}C years BP. Around 2,700 ^{14}C years BP, a shift to ice proximal sedimentation reflects the formation of more extensive and seasonally persistent sea ice. The Müller Ice Shelf, now present in the fjord, advanced approximately 400-500 years ago coincident with the Little Ice Age (LIA) (Domack et al., 1995). Results indicate environmental variability throughout the Holocene. Timing of the transitions correlates with Northern Hemisphere "T-Events" and ice core data from Greenland (GISP2), indicating the possibility of coherent climate variability in the Holocene, at least for the high latitudes. (Auth. mod.)

E-54768

Straten, B.T., **Evidence for gravity flows as sediment transport systems from high resolution seismic data and piston cores taken from Admiralty Bay, King George Island, Antarctica,** Clinton, N.Y., Hamilton College, Apr. 1996, 56p., B.A. thesis. Contribution to research experience for undergraduates: Office of Polar Programs, National Science Foundation (Earth sciences). Refs. p.42-43.

This report focuses on interpreting the HUNTEC high resolution seismic profiles and two piston cores to gain a better understanding of the processes of sedimentation within Admiralty Bay. Analyses were done on two cores, PD88-176 and PD92-19, including grain size, magnetic susceptibility. amd grain count analysis. After interpreting both the cores and the seismic data, a theory for sedimentation was developed. Sediments deposited at the head or sides of the fjord are periodically carried into the trough of the fjord by slumping. The HUNTEC seismic profiles shows evidence for several large slump blocks. After sediments are deposited into the bottom of the trough they move down fjord in infrequent gravity flows, possibly initiated by subaerial seismicity. Sediments may also be reworked and redeposited by strong bottom currents. Without a large sill to capture sediments at the entrance of Admiralty Bay, it is possible for sediments to be transported into King George Basin by both sediment gravity flows and large bottom currents. (Auth. mod.)

E-54769

LoPiccolo, M.H., **Productivity and meltwater cycles in Andvord Bay, Antarctica: evidence of high frequency paleoclimatic fluctuations,** Clinton, N.Y., Hamilton College, Apr. 1996, 52p., B.A. thesis. Contribution to research experience for undergraduates: Office of Polar Program, National Science Foundation (Earth sciences). Refs. p.51-52.

A detailed grain size analysis was conducted on samples from a 9 m-long piston core collected during cruise PD 87-III in Andvord Bay. Results were compared to total organic carbon (TOC) and magnetic susceptibility (MS) data acquired in 1992 from the same core. Results suggest that, as atmospheric temperatures increased, sea surface temperatures increased relatively quickly, thus stimulating productivity and higher carbon preservation. However, terrigenous sedimentation, controlled by glacial meltwater, increased at decadal to century scale rates as the sub-polar glacial systems supplying meltwater responded gradually to atmospheric temperature variations. The common cyclical pattern found in the data set provides strong evidence for paleoclimatic fluctuations within both the oceanic and glacial systems along the Antarctic Peninsula. These operate in a 200-300 year frequency band similarly to century-scale solar variability. (Auth. mod.)

E-54806

Spate, A.P., Burgess, J.S., Shevlin, J., **Rates of rock surface lowering, Princess Elizabeth Land, eastern Antarctica,** *Earth surface processes and landforms,* Sep. 1995, 20(6), p.567-573, 23 refs.

A series of micro-erosion-meter sites on different rock types and in differing wind regimes was established and re-read after four years on two sites in the Larsemann and Vestfold Hills. These two oases in East Antarctica are subjected to both wind abrasion and salt wedging. The measurements displayed bimodal distributions, indicating that both abrasion and single-grain detachment could be observed. Surface lowering rates of 0.015 and 0.022 mm/a were demonstrated for the Larsemann and Vestfold Hills, respectively. (Auth.)

E-54812

Inbar, M., **Fluvial morphology and streamflow on Deception Island, Antarctica,** *Geografiska annaler,* 1995, 77A(4), p.221-230, 25 refs.

Hydraulic geometry, runoff and sediment transport processes were studied during the 1991 summer season in two small pyroclastic drainage basins on Deception I., South Shetland Is. Daily discharge measurements were conducted in two channels draining 0.65 km^2 and 0.12 km^2. The empirical relationship between the depth, velocity and width exponents in channels with non-cohesive material is valid for the studied area. Width is relatively conservative during increase of water discharge. Runoff was almost continuous for about 40 days, showing a strong association between streamflow and temperature. Two main periods are distinguished in the annual hydrological regime: runoff during a short melting period of snow and glaciers; and snow cover and frozen period of the entire drainage area. Temperature is the main factor affecting the hydrological regime of the rivers. Snow availability during the summer season determines discharge water volumes in the nonglaciated basin. Fluvial sediment transport for the 1991 season was 46 tons/km^2/yr, one order of magnitude less than values for arctic rivers, but similar to average yearly sediment yield values of pyroclastic basins in mid-latitude areas. (Auth. mod.)

E-54814

Philippe, M., Torres, T., Barale, G., Thévenard, F., **President Head, Snow Island, South Shetland, a key-point for Antarctica Mesozoic palaeobotany,** *Académie des sciences, Paris. Comptes Rendus. Série II. Sciences de la terre et des planètes,* Dec. 1, 1995, 321(11), p.1055-1061, With French summary and an abridged French version of the paper. 30 refs.

New finds make the President Head flora, Snow I., South Shetlands, one of the richest of the Mesozoic of Antarctica. It is Valanginian-Hauterivian and not Jurassic in age. This flora is a key to the biostratigraphy of the continent. (Auth.)

E-54828

Marchant, D.R., Denton, G.H., Swisher, C.C., III, Potter, N., Jr., **Late Cenozoic antarctic paleoclimate reconstructed from volcanic ashes in the Dry Valleys region of southern Victoria Land,** *Geological Society of America. Bulletin,* Feb. 1996, 108(2), p.181-194, 77 refs.

The purpose of this paper is to introduce a late Cenozoic paleoclimate record for the Dry Valleys region, Victoria Land (independent from interpretations of the marine-oxygen isotope record and the Sirius Group flora and fauna), that relies on laser-fusion ^{40}Ar/^{39}Ar analyses of *in situ* ash deposits which occur in sand wedges on ventifact pavements, and in avalanche deposits in the Dry Valleys region.

E-54908

Clarke, G.L., Sun, S.S., White, R.W., **Grenville-age belts and associated older terranes in Australia and Antarctica,** *AGSO journal of Australian geology & geophysics,* 1995, 16(1-2), p.25-39, Refs. p.35-39.

During the Paleozoic era, multiple magmatic/tectonic events, causally linked to extensive mantle melting, markedly affected the Musgrave Block, the Albany-Fraser belt and parts of the east antarctic shield. It is possible that southern parts of the central Australian Arunta Block were also affected by this event. Equivalent terranes can be juxtaposed in conventional Gondwana reconstructions of southwestern Australia and Antarctica. Effects of a ≈1060 Ma Gondwana-wide magmatism include areally extensive dyke swarms and volcanics of the central Australian Bentley Supergroup. It is unclear to what extent the effects of a ≈550 Ma convergent event, that resulted in significant crustal overthickening and high-P recrystallization in Musgrave Block rocks, can be extrapolated to neighboring terranes. Nonetheless, this event may be indicative of plate margin processes of latest Neoproterozoic age that controlled the assembly of central Australia. (Auth.)

E-54912

Ishimaru, S., Yoshikawa, K., Kizaki, K., Harada, K., **Observations of moraine at the foot of Independence Hills in the southern Ellsworth Mountains, Antarctica,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.17-32, 11 refs.

A moraine field exists at the northeast foot of Independence Hills. Eight ridge-type moraines, and between them mound-type moraines, are recognized. Each moraine has different till deposits. The development of the moraines is described as follows: at the time when the outlet glaciers were developing from the ice sheet in the southwestern Independence Hills, till clayey crystalline schist was transported from the ice sheet, and slate till was transported from the ice field in northeastern Independence Hills. Ridge-type moraines of N-S direction, and mound-type moraines formed between these two ice flows. Consequently, lowering of the surface of Independence Ice Field was followed by shifting of ridge-type moraine in the NW-SE direction. Dirty ice layers are distributed in Independence Ice Field and beneath the moraine close to the ice field. Measurement of C-axis fabric of ice crystals has revealed that shear stress acts along the dirty ice layer in the ice stress shear in the ice, around the layers. (Auth. mod.)

E-54913

Yoshikawa, K., Ishimaru, S., Harada, K., **Weathering processes for Paleozoic marbles in Independence Hills and Patriot Hills, Ellsworth Mountains, Antarctica,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.33-45, 7 refs.

Weathering processes are mainly frost action and salt weathering in the Ellsworth Mountains of Antarctica, an extremely cold region. These processes were observed on different slopes composed of the same kind of marble, under different slope conditions. North-face and south-face walls of the bedrock showed the same shattering rate in summers of 1992 and 1993. Frost shattering of rocks is controlled by surface temperature, moisture, and the physical properties of the rock. The most important frost shattering factor in this study area was moisture balance, under the same kind of bedrock and the same freeze-thaw cycle. Snow particles are moved by katabatic wind, bringing moisture to the rock. Moisture is collected mainly in lower cliffs and cols. (Auth. mod.)

E-54915

Ishimaru, S., Yoshikawa, K., **Weathering processes of granite-porphyry in the Thiel Mountains, inland Antarctica,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.51-62, 6 refs.

Weathering processes of granite-porphyry were examined in the extremely cold environment of inland Antarctica. The weathering types in this area are classified into granular exfoliation and desert varnish. Granular exfoliation seems to occur by cracking of crystals. When the cracks form in the deeper part of the rocks, they are created along cleavages in phenocrysts. When they were observed near the margin of the rocks, they ran parallel to the rock surface. Some of the phenocrysts show granular exfoliation. The reddish brown (10R4/4) coating on the rock surface is due to desert varnish as a result of oxidation. Ferrous iron in hypersthene, biotite, ilmenite, and magnetite is altered into limonite by oxidation. Sulfide, which is important for oxidation, is concentrated in the surface of the rock. Limonite had filled cleavages and fractures, and penetrated into crystals from cleavages and fractures. (Auth. mod.)

E-54927

Italian Antarctic Research Programme, **Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports,** Siena, Sep. 1995, 64p., Refs. passim. For selected papers see C-54943, C-54946, E-54928 through E-54933, E-54935, E-54939 through E-54942, E-54944, E-54947 through E-54949, F-54945, L-

64934, L-54936 through L-54938, L-54950, L-54951 or 50-4391 through 50-4394.

During the austral summer of 1994-95, the 10th Italian Expedition to Antarctica was carried out. Scientific activities in the field of earth sciences were carried out within the framework of the following four core projects: structure and evolution of the lithosphere in the Ross Sea area; periantarctic basins and antarctic plate margins; glaciology and paleoclimate; and geophysical observatories. This volume contains 24 brief reports of the field activities.

E-54928

Capponi, G., Castelli, D., Fioretti, A.M., Oggiano, G., **Geological investigation at the Wilson-Bowers-Robertson Bay terranes boundaries (Northern Victoria Land, Antarctica): Morozumi Range, Lanterman Range, King Range and Salamander Range,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.7-10, 5 refs.

The field activities reported here, carried out from Dec. 7, 1994 to Jan. 2, 1995, focused on the following themes: the mafic-ultramafic belt of the Lanterman and Salamander Ranges; the contact between the Wilson and Bowers Terranes; the contact between the Bowers and Robertson Bay Terranes; the geological evolution of the Wilson Terrane; the Admiralty Intrusives; and the Granite Harbour Intrusives.

E-54929

Castelli, D., **Geological investigation on the High Grade Metamorphic Complex of Wilson Terrane (Campbell Glacier, northern Victoria Land, Antarctica),** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.11, 4 refs.

Field work on the High Grade Metamorphic Complex of the Wilson Terrane was a second-priority target during the 1994-95 Italian expedition. Nevertheless, some detailed field work was carried out along the west side of Campbell Glacier (from Mt. Queensland to Capsize Glacier) in order to review some areas within the preliminary Geological Map of Campbell Glacier High Grade Metamorphic Complex of 1994.

E-54930

Di Vincenzo, G., **Field work on Cambro-Ordovician granitoids in the Wilson Terrane,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.12, 2 refs.

During the austral summer of 1994-95, field investigations on the Cambro-Ordovician granitoids of the Wilson Terrane of northern Victoria Land were mainly aimed at completing the detailed geological map of the areas of the Northern Foothills, Inexpressible I. and Vegetation I., begun during the previous Italian antarctic expedition. Along the northern side of Inexpressible I. the emplacement relationships were recognized of three facies already cited in the literature (Skinner, 1989), here reported from the oldest to the youngest: Vegetation Granite, Seaview Granodiorite and Hells Gate Granite.

E-54931

Talarico, F., **Geology and regional metamorphism of the northeastern Shackleton Range (EUROSHACK 1994-95 Expedition in the Shackleton Range). Preliminary report,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.13.

The field activity during the international (GB-G-I-Russia) EUROSHACK 1994-95 expedition was addressed to mapping and detailed field work in the northern and eastern areas of the Shackleton Range, including the Lagrange Nunataks, the Herbert Mountains and the Pioneer Escarpment. The new structural and petrological data (included in a 1:50,000 map) show the pre-Ordovician crystalline rocks which, from S to N (and structurally from the lowermost to the uppermost) include: a "turbidite-type" unit; a "shelf-type" unit; an "ophiolite-type" unit and a "basement-type" unit.

E-54932

Talarico, F., **Mapping and petrological investigations in the Proterozoic Read Metamorphic Complex (EUROSHACK 94-95 Expedition in the Shackleton Range). Preliminary report,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.14.

The Read Metamorphic Complex includes the oldest rocks so far known in the Shackleton Range (2.3-1.4 Ga) and is exposed in a tectonic window within a low-grade metaturbiditic unit (Mt. Wegener Nappe). The main objective during the 1994-95 EUROSHACK expedition has been to map the whole complex and to perform extensive sampling and field investigations following a multi-disciplinary (petrological- structural-geochronological) approach.

E-54933

Orsi, G., **Investigation of the Ferrar Supergroup in the area between David Glacier and 76°00'S,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.15.

Field work carried out during the 1994-95 Italian expedition was aimed at mapping, and sampling for petrologic and isotopic analyses, the rocks of the Ferrar Supergroup in the area between the David Glacier and 76°00'S. The exposed rocks belong to the Ferrar Supergroup and the Beacon Supergroup. The majority are intrusives of the Ferrar Dolerites and intrude both volcanics of the Kirkpatrick Basalts and sediments of the Beacon Supergroup.

E-54935

Baroni, C., **Geomorphological evolution of Victoria Land. Abandoned penguin rookeries as a tool for investigation on glacial history, Holocene isostatic rebound and environmental changes,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.17, 7 refs.

Searching for abandoned Adélie penguin rookeries on Holocene raised beaches, marine terraces and other coastal ice-free areas of the southern Victoria Land is reported. Abandoned penguin nesting sites are relevant to studies of antarctic glacial history since the last glacial maximum and the Holocene environmental changes. Concentrations of well-sorted pebbles that penguins selected to build their nests characterize the fossil rookeries. Accumulation of droppings, feathers, egg fragments and bird remains produce ornithogenic soils that can be radiocarbon dated.

E-54939

Camerlenghi, A., Rebesco, M., Accerboni, E., Crise, A., Pudsey, C., Trincardi, F., **R/V OGS-Explora—Seventh Antarctic Cruise Leg 1 (Ushuaia, 22.1.95-Ushuaia, 26.2.95). Program SEDANO (Sediment Drifts of the Antarctic Offshore),** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.27-28, 1 ref.

SEDANO is an interdisciplinary program focused on the study of sedimentation on the continental rise of the Pacific Margin of the Antarctic Peninsula. High resolution multichannel seismic reflection surveying, gravity coring, and deployment of moorings with sediment traps and current meters, are the main tools adopted for the program. Field work performed on the *OGS-Explora* is reported to have been successful. Although most of the results will be available after opening, sampling and analysis of cores, after processing of the seismic lines and after recovery of the moorings, some relevant observations made on shipboard analysis of data are discussed.

E-54940

Camerlenghi, A., et al, **R/V OGS-Explora—Seventh Antarctic Cruise Leg 1 (Ushuaia, 22.1.95-Ushuaia, 26.2.95). Site survey of ODP proposal #452 (Antarctic glacial history and sea-level change),** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.29-30, 1 ref.

ODP Proposal #452 was submitted to the JOIDES Office before the deadline of Jan. 1, 1994. The proposal is a product of the ANTOSTRAT Antarctic Peninsula Regional Working Group. Five days of ship time of Leg 1 of the 7th Antarctic PNRA cruise of the R/V *OGS-Explora* were dedicated to the collection of high resolution multichannel seismic profiles along the two main drilling transects on the continental shelf. The objectives of the survey were reached with the acquisition of 591.1 km of seismic lines in the transects area. In addition, two short surveys with high resolution single-trace acquisition were conducted in two intermediate areas for possible location of additional sites.

E-54941

Pipan, M., Finetti, I., Del Ben, A., King, E., Reading, A., **R/V OGS-Explora—Seventh Antarctic Cruise Leg 1 (Ushuaia, 22.01.1995-Ushuaia, 26.02.1995). Offshore seismic exploration in Marguerite Bay and off Adelaide Island, Antarctic Peninsula,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.31-32.

The seismic data acquisition program in the Marguerite Bay and Adelaide I. area was designed by the Institute of Geodesy and Geophysics of the University of Trieste in cooperation with the British Antarctic Survey (BAS). The program encompasses offshore vertical reflection seismics and onshore Wide Angle Reflection and Refraction (WARR) recordings. The quality of the preliminary subsurface images obtained from the shipboard processing shows the great potential of the new seismic data for the reconstruction of the deep crustal conditions in the explored area.

E-54942

Lodolo, E., Zitellini, N., Geletti, R., **Structure and Cenozoic tectonic evolution of the South Scotia Ridge—Cruise report R/V OGS-Explora '95, Leg 3,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.40-42.

This survey investigated the structure and tectonic setting of the western portion of the South Scotia Ridge and the southern margin of the Powell Basin, using multichannel seismic reflection, magnetic and gravimetric measurements. An 800 km-long seismic line was acquired across the whole central Scotia Sea from the northern margin of the South Orkney microcontinent to the North Scotia Ridge, and reaching the DSDP 511 site on the Falkland Plateau. Preliminary data show evidence of 2 fronts of deformation; the youngest retreated landward, suggesting distinct episodes of plate convergence. No evidence of continental crust was found in the central Scotia Sea.

E-54944

Guglielmin, M., Biasini, A., Smiraglia, C., **First results of electric soundings on polar landforms of the Northern Foothills (Victoria Land, Antarctica),** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.44-46, 10 refs.

During the X Italian expedition in Antarctica (Oct.-Nov. 1994) more than 20 d-c electrical soundings were carried out on different landforms in the Northern Foothills, such as rock glaciers, debris covered glaciers and beaches with patterned ground. A preliminary analysis of the collected data allowed recognition of different geological structures in the studied landforms. In particular, the authors found in every landform a thin active layer (5-20 cm); the resistivity values of these unfrozen sandy-gravelly material ranges from 1,300 to 2,000 ohm.m. Under this lies a layer of 1 to 3 m thick, characterized by a relatively low resistivity values (14,000-50,000 ohm.m).

E-54947

Corradi, N., Ferrari, M., Fierro, G., Ivaldi, R., Vetuschi Zuccolini, M., **Preliminary sedimentological and geotechnical data on cores collected in the Joides Basin (Ross Sea—Antarctica),** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.51-54, 7 refs.

Six gravity cores were collected during the second leg of the X antarctic cruise with the aim of determining the physical and mechanical properties of the sediments through sedimentological and geotechnical analyses. The objective was to investigate how the action of the grounded ice had affected continental shelf sediments in the Ross Sea and to begin mapping to recognize the possible extension and thickness of glacial tongues during a period presumably corresponding to the last Pleistocene glacial cycle. Evidence suggests that variations in the extent of the ice sheets caused the west caps to move along the antarctic sea bottom, as has been proven by geophysical prospecting, core drilling and sea bottom sampling.

E-54948

Taviani, M., Trincardi, F., **Cruise NBP95-01 in the Ross Sea,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.55.

Cruise NBP95-01 took place in the Ross Sea aboard the R/V *Nathaniel B. Palmer* during the austral summer of 1994-95 on a marine geological mission. The mission consisted of two legs. The first leg was mostly devoted to the acquisition of geophysical data and piston cores. During the second leg, considerable effort was made to get expanded and undisturbed Holocene sedimentary sequences. Cruise NBP95-01 provided high-quality geomarine data from the Ross Sea continental shelf and slope.

E-54949

Corradi, N., Finocchiaro, F., Marozzi, G., Melis, R., Ravaioli, M., Vetuschi Zuccolini, M., **Ross Sea paleoclimate cruise 1995: marine geology activity report,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.56-59, 8 refs.

In the first two months of 1995, an oceanographic cruise was organized by the National Antarctic Research Program (10th Expedition), which was mainly committed to physical oceanographic research, but also included some surveys regarding marine geology and environmental chemistry. The marine geological research carried out within the frame of the "Glaciology and Paleoclimate" Project has the aim to reconstruct late Quaternary paleoclimatic events in the Ross Sea area, through sedimentological, micropaleontological, geotechnical and geochemical surveys.

E-54960

Mikhal'skiĭ, E.V., **Petrochemical characteristics of the igneous rocks of the Fisher Massif (East Antarctica)** [Petrokhimicheskaia kharakteristika izverzhennykh porod massiva Fisher (Vostochnaia Antarktida)], *Antarktika,* 1993, No.32, p.41-57, In Russian with English summary. 17 refs.

Fisher Massif is thought to represent a tectonically transitional zone between relatively stable granite-green-stone terrane to the south and mobile charnockite-granulite belt to the north, mobile up to Phanerozoic time. It is composed of volcano-sedimentary rocks and igneous rocks of different composition. The volcanics were metamorphosed under epidote-amphibolite facies and include basalts, andesito-basalts, dacites and riodacites, probably derived from different source regions. The igneous rocks comprise small, mainly compositionally uniform bodies representing a gabbro-diorite-plagiogranite suite, with a probable upper age of about 1400 Ma, constrained by U-Pb zircon data for plagiogranites. Trace element ratios show that the igneous and volcanic rocks probably derive from the same source region. It is proposed that Fisher Massif volcanics derive from the local incipient melting of an upper mantle source region due to a volatile flux caused by the heat from ascending "hot spot" material. (Auth. Mod.)

E-54961

Bardin, V.I., Kostiaev, A.G., Surkov, A.V., **Lithology of diamictonic rocks in Antarctica and the East European plain and the problem of determining the genesis of the sediments** [Litologicheskie osobennosti diamiktonovykh porod Antarktidy i vostochno-Evropeĭskoĭ ravniny (k probleme vyiavleniia genezisa osadkov)], *Antarktika,* 1993, No.32, p.58-78, In Russian with English summary. 14 refs.

On the basis of granulometric, geochemical and poorly known granulomineralogic analysis, the conditions were estimated for formation of diamictonic sediments of the East Antarctic and the East European Plain. According to a number of features—the heightened texture, grain-size of the matrix and geochemical criteria, problematic diamictonic rock of the Pagodroma Gorge and in the exposure "Klyki Drakona" (East Antarctica) differ from typical Antarctic and North Taimyr continental moraines and can be treated as different facies of glaciation of the coastal zone of the shelf shallow. The East European Plain formations of this class, unlike diamictonic sediments in Antarctica, are regarded as drifts brought by seasonal shore ice into a vast shallow fresh water basin. (Auth.)

E-54968

Putz, M.K., Taylor, E.L., **Wound response in fossil trees from Antarctica and its potential as a paleoenvironmental indicator,** *IAWA journal,* 1996, 17(1), p.77-88, Refs. p.86-88.

Numerous permineralized axes of Middle Triassic age from Fremouw Peak show evidence of mechanical wounding and wound responses. These consist of both elongate and triangular-shaped scars. Some scars can be detected beneath subsequent secondary xylem, indicating that wounding occurred early in stem development. In other stems, scars remained open, suggesting late wounding and the permanent disruption of the cambium. In cross section most stems display little callus tissue, but wound periderm can be seen along the margin of the scar. In some stems the wound phellogen has formed phellem and phelloderm within the wounded area oriented perpendicular to the growth rings. Although some scars resemble those produced by fires, the authors were unable to document the presence of charcoal around scars. In modern ecosystems wounds may be caused by other agents, including debris drifting in floods, flowing ice, avalanches, and animals. Each of these potential sources is reviewed in relationship to the paleoclimate in the region during the Triassic. (Auth.)

E-54978

Barale, G., Philippe, M., Torres, T., Thévenard, F., **Reappraisal of the Triassic flora from Williams Point, Livingston Island (South Shetland Islands, Antarctica): systematical, biostratigraphical and paleogeographical implications,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.9-38, With Spanish summary. Refs. p.34-38.

The more extensive assemblage of fossil plants remains from the northern part of Williams Point is presented. Two different floras were found in the stratigraphical section. Flora 1 consists of six forms: *Dictyophyllum, Cladophlebis, Scoresbya, Sagenopteris, Sphenobaiera,* and *Pagiophyllum.* Flora 2 is more diversified, with *Linguifolium steinmannii,* and many forms of *Dicroidium* type. Also a new species, *Cladophlebis williamsensis,* is recognized. The systematic composition indicates an Upper Triassic age. The autochthony of plant fossils is asserted and permit one to infer and to revise the paleogeographic conditions for this region at the end of the Triassic. (Auth.)

E-54979

Schuller, P., Ellies, A., Handl, J., Wilkendorf, R., **^{137}Cs areal concentration and vertical distribution in soils from Ardley Island** [Concentración superficial y distribución vertical de ^{137}Cs en suelos de la península Ardley], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.39-47, In Spanish with English summary. 16 refs.

^{137}Cs areal concentration and vertical distribution were determined at six sites on Ardley I. The total ^{137}Cs areal concentration ranges from 121 to 532 Bq/m^2. Its high variation can be attributed to water runoff and soil erosion. A relatively high percentage of the areal concentration is retained by moss and lichen cover. ^{137}Cs areal concentration shows an exponential decrease with depth. The penetration in the soil profile is influenced predominantly by the short duration of the soil melting periods. (Auth.)

E-54989

Takamatsu, N., Kato, N., Matsumoto, G.I., Torii, T., **Salt origin viewed from lithium distributions in lake and pond waters in the McMurdo Dry Valleys, Antarctica,** *International Association of Theoretical and Applied Limnology. Verhandlungen. Proceedings. Traveaux,* Dec. 1993, 25(Part 2), p.954-956, Congress in Barcelona 1992. Edited for the Association by A. Sládečkova. 7 refs.

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Lithium and major ionic components in pond and lake waters of the McMurdo Dry Valleys were determined to elucidate the origin of dissolved salts. The high Li concentrations with high Ef_{Li} values of Lake Vanda and Don Juan Pond imply that the salts originated from ground waters influenced by hydrothermal activity. The low Li contents with extremely high Ef_{Li} values of the Labyrinth ponds strongly suggest that Li is derived from snow. The decrease of Ef_{Li} values during the concentration of salts may be explained by the migration of Li into ice phase.

E-54990

McKnight, D.M., Andrews, E.D., **Hydrologic and geochemical processes at the stream-lake interface in a permanently ice-covered lake in the McMurdo Dry Valleys, Antarctica,** *International Association of Theoretical and Applied Limnology. Verhandlungen. Proceedings. Traveaux,* Dec. 1993, 25(Part 2), p.957-959, Congress in Barcelona 1992. Edited for the Association by A. Sládečkova. 4 refs.

DLC QH98.I5 v.25, pt.2 1992

This paper presents initial results from a tracer experiment conducted in Huey Creek, which is one of about 10 small streams flowing into Lake Fryxell. The purpose of the experiment was to describe exchange between the stream and hyporheic zone in reaches of different gradient and to determine the flowpaths for streamwater mixing into the lake. The experiment employed two inorganic tracers, Li and Br, which are present in the streamwater at concentrations in the range of 5-10 μg/l. Using a cation and an anion as tracers allows for the evaluation of conservative behavior of the tracers. (Auth. mod.)

E-54992

Matsumoto, G.I., Ohtani, S., Murayama, H., Hirota, K., Watanuki, K., Torii, T., **Geochemical features of organic components in lake sediments and algal mats from the Lützow-Holm Bay region, Antarctica,** *International Association of Theoretical and Applied Limnology. Verhandlungen. Proceedings. Traveaux,* Dec. 1993, 25(Part 2), p.968-970, Congress in Barcelona 1992. Edited for the Association by A. Sládečkova. 10 refs.

DLC QH98.I5 v. 25, pt. 2 1992

Geochemical features of hydrocarbons and fatty acids in lake and pond sediments from the Lützow-Holm Bay region were studied in relation to source organisms. Unusually long-chain n-alkanes and n-alkanoic acids ($>C_{19}$) were detected in certain samples, together with short-chain alkanes and alkenes, and alkenoic and branched acids. Also, triterpenes such as hop-22(29)-ene and steranes were found in some samples. These compounds may be derived from diatoms, green algae and/or cyanobacteria, with some influences of bacteria. However, the specific organisms are not yet clear. Further biogeochemical and physiological studies of pure cultured antarctic algal and cyanobacterial mat communities should be fruitful. Normal alkenoic acid/n-alkanoic acid ratios are probably reflecting the degree of destruction of organic matter. (Auth.)

E-55006

Luyendyk, B., Cisowski, S., Smith, C., Richard, S., Kimbrough, D., **Paleomagnetic study of the northern Ford Ranges, western Marie Byrd Land, West Antarctica: motion between West and East Antarctica,** *Tectonics,* Feb. 1996, 15(1), p.122-141, Refs. p.138-141.

A paleomagnetic study of Paleozoic and Mesozoic crystalline rocks in the northern Ford Ranges of Marie Byrd Land has determined a middle Cretaceous (ca. 100 Ma) paleomagnetic pole and provided constraints on possible clockwise rotation of these ranges and on the rifting of east Gondwana. The ^{40}Ar/^{39}Ar thermochronology data from the Fosdick Mountains record a period of rapid cooling from ≈700°C beginning at ≈100 Ma. All rocks from the Fosdick and Chester Mountains are normally polarized. The authors interpret thermochronology and paleomagnetic data to infer that the region was extensively remagnetized in middle Cretaceous time. Combining middle Cretaceous poles determined for three other studies of the Antarctic Peninsula, Thurston I., and the Ruppert-Hobbs coasts with theirs gives a Pacific West Antarctic pole at 215.2°E, 73.5°S (A95 4.0°, KAPPA 528.9). Accepting 10° of discordance, the authors favor an interpretation where Pacific West Antarctic crustal domains or microplates have rotated clockwise 40° to 90° and translated a few degrees away from East Antarctica during Late Cretaceous time. (Auth. mod.)

E-55042

Duane, A.M., **Palynology of the Byers Groups (Late Jurassic-Early Cretaceous) of Livingston and Snow islands, Antarctic Peninsula: its biostratigraphical and palaeoenvironmental significance,** *Review of palaeobotany and palynology,* Mar. 1996, 91(1-4), p.241-281, 88 refs.

The Byers Group, exposed on Byers Peninsula, Livingston I, and Snow I., is a mudstone-dominated sequence deposited in a fore-arc setting. Palynological studies on parts of the Byers Group have provided new data on Early Cretaceous biostratigraphy, palaeoenvironments and palaeoclimate. Dinoflagellate cyst assemblages permit correlation of the marine mudstones from Snow I. (President Head) within the Byers Group stratigraphy of Byers Peninsula. A marginal, shallow-marine palaeoenvironment is indicated by the palynological content of the Byers Group. Occasionally, there is evidence of slightly deeper marine influence within the President Beaches Formation. A temperate palaeoclimate with occasional high humidity is suggested for the Byers Group. The land vegetation probably consisted of a coniferous forest with abundant podocarps and araucarians, a fern understorey and minor amounts of lycopods and bryophytes. The Byers Group palynoflora shows strongest affiliation to those from the Mesozoic of Australia and southern South America, although marked provincialism is evident within the Valanginian marine microplankton content. (Auth. mod.)

E-55044

Fielding, C.R., Webb, J.A., **Facies and cyclicity of the Late Permian Bainmedart Coal Measures in the Northern Prince Charles Mountains, Mac. Robertson Land, Antarctica,** *Sedimentology,* Apr. 1996, 43(2), p.295-322, Refs. p.318-322.

This paper describes and interprets the deposits of a coal-bearing, high-energy alluvial system from East Antarctica. The Late Permian Bainmedart Coal Measures form part of the fill of a narrow, corridor-like basin which is interpreted as the remnant of a continental graben or half-graben. The examination of both lateral sediment body geometry and vertical sequence aspects allows considerable insights into the controls on sediment deposition and accumulation. The authors conclude that the dominant control on sediment body architecture is climatic and that, by analogy, similar basin fills elsewhere may also preserve a record of climatic fluctuation. (Auth. mod.)

E-55055

Bartek, L.R., Henrys, S.A., Anderson, J.B., Barrett, P.J., **Seismic stratigraphy of McMurdo Sound, Antarctica: implications for glacially influenced early Cenozoic eustatic change?,** *Marine geology,* Feb. 1996, 130(1-2), p.79-98, 55 refs.

During Leg 2 of the *Polar Duke* 90 (PD90) cruise in the Ross Sea approximately 650 km of high-resolution seismic data were collected in McMurdo Sound with the main objective of facilitating regional correlation of stratigraphic events observed in the cores of the CIROS-1, DVDP-15, and MSSTS-1 drilling programs, and thereby providing an opportunity to test hypotheses on linkages between Cenozoic eustatic and antarctic ice volume fluctuations. Twenty unconformity-bound, seismic-stratigraphic sequences (labeled from top A to T) were identified in the McMurdo Sound PD90 database. However, seismic data from the shallow shelf on which CIROS-1 was drilled show erosional surfaces at many levels, indicating a condensed section in this area. Seismic units O, P and Q correspond to the upper Oligocene interval where they recognized 3 glacioeustatic events. These three sequences, totaling around 300 m in thickness, can be traced over a distance of almost 100 km. However, they lack the seismic characteristics of glacial facies identified by Anderson and Bartek (1992) and thus the significance of waxing and waning events suggested for upper Oligocene strata in CIROS-1 remains equivocal. (Auth. mod.)

E-55069

Berkman, P.A., Prentice, M.L., **Pliocene extinction of antarctic pectinid mollusks,** *Science,* Mar. 15, 1996, 271(5255), p.1606-1607, 17 refs.

A report of a Pliocene/Pleistocene molluscan extinction in Florida raised the question of when a corresponding mass extinction of cold regions molluscans had occurred. It appears that such an extinction did occur around Antarctica near the end of the Pliocene. In support of this conclusion 16 publications are cited.

E-55070

Benoit, P.H., Sears, D.W.G., **Rapid changes in the nature of the H chondrites falling to earth,** *Meteoritics & planetary science,* Jan. 1996, 31(1), p.81-86, 37 refs.

Previously identified was a subgroup of antarctic H chondrites that are significantly different from H chondrites among the modern falls in terms of induced thermoluminescence (TL), metallographic cooling rate, and cosmogenic inert gas contents. Examined here is their terrestrial and thermal history as apparent in their natural TL and radioactive cosmogenic isotope abundances. These meteorites have a tendency towards high ^{26}Al activities and fairly short ^{14}C and ^{36}Cl terrestrial ages. They also sometimes exhibit unusually high natural TL levels, which have been previously interpreted as indicating orbital evolution from perihelia >1.2 AU to 1 AU within the last <10^{5} years. The authors suggest that the nature of the meteorites falling to Earth is not independent of time but depends on stochastic events, such as the breakup of parent bodies and recent variations in orbit. (Auth.)

E-55071

Warren, P.H., Kallemeyn, G.W., **Siderophile trace elements in ALH84001, other SNC meteorites and eucrites: evidence of heterogeneity, possibly time-linked, in the mantle of Mars,** *Meteoritics & planetary science,* Jan. 1996, 31(1), p.97-105, 57 refs.

The authors report neutron activation analyses, including radiochemical determination of trace siderophile elements for three SNC/Martian meteorites, and Os and Re results for numerous eucrites. Ratios such as Ga/Al in the SNC orthopyroxenite ALH84001 confirm its Martian affinity despite its many distinctive characteristics. To the list of ALH84001's idiosyncrasies can now be added extraordinarily low concentrations of Au, Ni and, especially, Re (17 pg/g), for a Martian meteorite. There may be several possible origins for the anomalously low Re content in ALH84001, including metasomatism or alteration. The preferred model is that the ALH84001 parent melt formed in a mantle source region that was far more Re-depleted, and/or at a substantially lower oxygen fugacity, than the sources of the young SNC meteorites. Such a contrast is consistent with models that replenish siderophile elements in planetary mantles by gradual admixture of late-accreting matter and similarly derive most planetary water very late in accretion. (Auth. mod.)

E-55077

Fitzsimons, I.C.W., **Metapelitic migmatites from Brattstrand Bluffs, East Antarctica—metamorphism, melting and exhumation of the mid crust,** *Journal of petrology,* Apr. 1996, 37(2), p.395-414, 59 refs.

Metapelitic migmatites at Brattstrand Bluffs, East Antarctica preserve granulite assemblages and a complex deformational history. Crystallized granitic melt accounts for ca. 25% of exposed rocks, and was produced by biotite dehydration-melting reactions in the host metapelite. Variable degrees of melt production and extraction resulted in a range of bulk compositions in the residual metapelite, from quartz-rich migmatites to restitic quartz-absent pelite. Exhumation has been proposed as a cause of dehydration melting in the Himalayas and elsewhere, but melting at Brattstrand Bluffs was ultimately driven by the tectonic perturbation and subsequent thermal relaxation responsible for high metamorphic temperatures. Exhumation did not drive melting reactions, but is is likely that the presence of melt focused deformation in the migmatites and thus promoted exhumation. (Auth. mod.)

E-55085

Muir, R.J., Ireland, T.R., Weaver, S.D., Bradshaw, J.D., **Ion microprobe dating of Paleozoic granitoids: Devonian magmatism in New Zealand and correlations with Australia and Antarctica,** *Chemical geology,* Jan. 10, 1996, 127(1-3), p.191-210, 70 refs.

Precise ion microprobe U-Pb zircon ages have been obtained from a representative set of Paleozoic igneous rocks from the Western Province of South Island, New Zealand. Granitoid rocks forming the Karamea Batholith and related plutons in the Buller terrane all yield crystallization ages that are indistinguishable within a ±5 Ma uncertainty at 375 Ma (Middle-Late Devonian). The Devonian granitoids in New Zealand can now be correlated with rocks of similar age in northern Victoria Land (Admiralty Intrusives) and Marie Byrd Land (Ford Granodiorite) in West Antarctica, in NE Tasmania, and in the central part of the Lachlan Fold Belt in SE Australia. On a reconstruction of the SW Pacific margin of Gondwana, prior to later break-up, it is possible to trace out a semi-continuous magmatic belt in excess of 2000 km in length. (Auth. mod.)

E-55102

Cantrill, D.J., Nichols, G.J., **Taxonomy and palaeoecology of Early Cretaceous (Late Albian) angiosperm leaves from Alexander Island, Antarctica,** *Review of palaeobotany and palynology,* Apr. 1996, 96(1-2), p.1-28, 68 refs.

Seven species of angiospermous leaves from the mid to Late Albian of Alexander I. provide further evidence of angiosperm radiation into high southern palaeolatitudes. The leaves have both palmate (three species) and pinnate (four species) venation. Entire margined leaves with brochidocromus venation are interpreted as belonging to the Magnoliidae, and possibly include members of the Laurales. Palmately veined forms representing the Laurales occur as do palaeoherbs. Other taxa have marginal teeth comparable to those found in the Rosidae. Palaeoecological analysis indicates that one species is a herbaceous streamside colonizer, another is a small shrubby plant growing adjacent to levee banks, while several others occur infrequently in swamp deposits and probably represent a scattered understorey of trees and shrubs amongst a conifer and pentoxylalean overstorey. (Auth. mod.)

E-55111

Lisker, F., **Geodynamics of the West Antarctic rift system based on apatite fission tracks** [Geodynamik des Westantarktischen Riftsystems basierend auf apatit-spaltspuranalysen], *Berichte zur Polarforschung,* 1996, No.198, 108p., In German with English summary. Refs. p.94-107.

The West Antarctic Rift System is one of the major rift systems, extending for more than 3000 km inland from the Pacific continental margin of Antarctica. Its most characteristic feature is an asymmetric evolution of both rift shoulders. Using apatite fission track analysis, the uplift/denudation history of the lower Amundsen-Bellinghausen rift flank has been compared with the scarp, well defined western rift shoulder of the Transantarctic Mountains and the margin of the east antarctic craton. The antarctic-wide Ferrar event which accompanied the initial break-up of Gondwana can be traced by apatite fission tracks. The intrusion of the Ferrar Dolerites led to the reheating of the faulted Palaeozoic basement of Oates Land without significant uplift/denudation. The second rifting phase of the West Antarctic Rift System is characterized by strong but episodic uplift of the Transantarctic Mountains from 50 Ma to the present. The amounts of uplift and denudation gradually decrease from 10 km within the Transantarctic Mountains to 2 km in Oates Land adjacent to the east antarctic craton. (Auth. mod.)

E-55121

Kapitsa, A.P., Ridley, J.K., Robin, G. de Q., Siegert, M.J., Zotikov, I.A., **Large deep freshwater lake beneath the ice of central East Antarctica,** *Nature,* June 20, 1996, 381(6584), p.684-686, 20 refs.

In 1974-75, an airborne radio-echo survey of ice depths over central East Antarctica led to the discovery of a sub-ice lake of unknown depth and composition, with an area of about 10,000 km^2 and lying beneath ca. 4 km of ice. In 1993, altimetric data from satellite measurements provided independent evidence of the lake's areal extent, thus confirming it to be the largest known sub-ice lake by an order of magnitude. Here new altimetric and radio-echo data are analyzed along with existing seismic data, to show that the lake is deep (mean depth of 125 m or more) and fresh, and that it has an area that exceeds previous estimates by about 50%—dimensions comparable with those of Lake Ontario. Residence time of the water in the lake is estimated to be of the order of tens of thousands of years; the mean age of water in the lake, since deposition as surface ice, is about one million years. Regional ice dynamics can be explained in terms of steady-state ice flow along and over the lake. (Auth.)

E-55159

Cantrill, D.J., **Fern thickets from the Cretaceous of Alexander Island, Antarctica containing *Alamatus bifarius* Douglas and *Aculea acicularis* sp. nov.,** *Cretaceous research,* Apr. 1996, 17(2), p.169-182, Refs. p.181-182.

Within the Albian Fossil Bluff Group of Alexander I. sheet flood deposits have preserved palaeosols with *in situ* ferns *Alamatus bifarius* Douglas and *Aculea acicularis* sp. nov. Reconstructed as upright ferns, with fronds arising from a creeping subterranean rhizome, they formed thickets up to 80 cm high. Analyses of the leaf litter suggest that the fern thickets developed between a patchy araucarian overstorey. Interspersed within the thickets there were rare podocarp shrubs and beneath this overstorey a ground layer of thalloid liverworts. (Auth.)

E-55165

Hiller, A., Hermichen, W.D., Wand, U., **Radiocarbon-dated subfossil stomach oil deposits from petrel nesting sites: novel paleoenvironmental records from continental Antarctica,** *Radiocarbon,* 1995, 37(2), International Radiocarbon Conference, 15th, Glasgow, Scotland, 15-19 Aug. 1994. Proceedings, p.171-180, Refs. p.179-180.

Radiocarbon dating is an important tool for reconstructing Late Quaternary paleoenvironmental history of the antarctic continent. Because of the scarcity of datable material, new suitable substances are welcomed. The authors present novel paleoenvironmental records—subfossil stomach oil deposits (mumiyo). This waxy organic material is found in petrel breeding colonies, especially in those of snow petrels, *Pagodroma nivea.* The substance is formed by accumulation and solidification of stomach oil regurgitated for the purpose of defense. The authors demonstrate and outline the usefulness and limitation of ^{14}C dating of mumiyo for determining dates of local ice retreat, moraines and petrel occupation history. (Auth.)

E-55193

Valbracht, P.J., et al, **Helium, neon and argon isotope systematics in Kerguelen ultramafic xenoliths: implications for mantle source signatures,** *Earth and planetary science letters,* Feb. 1996, 138(1-4), p.29-38, 38 refs.

New noble gas data are presented for ultramafic mantle xenoliths, occurring in 10-20 Ma old volcanics from the Kerguelen Archipelago. Fusion results indicate that neon is isotopically primitive, whereas helium shows considerable isotopic variations, tending towards more radiogenic values. These fusion results of mantle xenoliths are the first report of a difference between helium and neon isotope systematics, which in most other studies show correlated isotope systematics. Helium isotopic compositions obtained by crushing the same xenoliths yield values which are identical to or slightly lower than the theoretical values predicted by the neon data. Comparison of helium with mantle neon and argon reveals that the samples have experienced considerable helium loss, making the helium isotope systematics of the xenoliths prone to secondary disturbances. The results, together with helium and neon obtained by crushing, preserve evidence for a primitive mantle component in these Kerguelen xenoliths. (Auth. mod.)

E-55206

Clayton-Greene, J.M., Hendy, C.H., Hogg, A.G., **Chronology of**

a Wisconsin age proglacial lake in the Miers Valley, Antarctica, *New Zealand journal of geology and geophysics,* 1988, Vol.31, p.353-361, 18 refs.

Mapping and oxygen isotopic, C-14, and U/Th analyses of lacustrine sediments have shown that a lake (glacial Lake Trowbridge) proglacial to the Ross Sea I Ice Sheet occupied Miers Valley from at least 23,000 years B.P. until 10,000 years B.P. This lake was at least 80 m deep and extended to more than 156 m above present sea level at its maximum extent 18,000-19,000 years ago. The lake was filled with waters with a similar isotopic composition to the modern Koettlitz Glacier. By 13,000-14,000 years B.P. evaporation had considerably reduced the size of the lake and resulted in the precipitation of calcite and gypsum evaporites. The isotopic composition of abundant sulphates within the evaporite sequences shows that although they were precipitated from isotopically depleted glacial meltwaters, the sulphates originated from seawater. (Auth. mod.)

E-55226

Mattielli, N., Weis, D., Grégoire, M., Mennessier, J.P., Cottin, J.Y., Giret, A., **Kerguelen basic and ultrabasic xenoliths: Evidence for long-lived Kerguelen hotspot activity,** *Lithos,* Apr. 1996, 37(2-3), p.261-280, 64 refs.

The xenoliths from the Southeast Province of the Kerguelen Archipelago derived from the lower crust or the upper mantle can help define the characteristics of the mantle sources below Kerguelen and improve the constraints on the formation of the Kerguelen Is. and plateau. This petrographic, geochemical and isotopic (Sr, Nd and Pb) study focuses on peridotites (Type Iα and Type Iβ), 2-pyroxenes-spinel bearing ultrabasic and basic xenoliths (Type IIa) and ilmenite metagabbros (Type IIc). The isotopic data suggest that the Kerguelen xenoliths were formed recently (≤45 Ma), and thus support the hypothesis of the formation of the Plateau by the arrival of the plume at the base of the lithosphere (ca. 115 Ma). The Plateau would have grown through several pulses of plume activity (ca. 115, 80, 40 Ma), while the geotectonic environment changed over time from a ridge-centered position to the present intraplate position. The occurrence of deep Type IIa and IIc xenoliths can explain the crustal thickening and provides evidence for the growth of oceanic plateaus by vertical accretion. (Auth. mod.)

E-55230

Harvey, R.P., McSween, H.Y., Jr., **Possible high-temperature origin for the carbonates in the Martian meteorite ALH84001,** *Nature,* July 4, 1996, 382(6586), p.49-51, 22 refs.

The meteorite Allan Hills (ALH)84001, commonly accepted to be of Martian origin, is unique among known Martian meteorites in containing abundant, zoned, pre-terrestrial carbonate minerals. Reported here are analyses of the major-element compositions of the carbonates, which provide an independent constraint on the composition and temperature of the fluid from which they formed. The authors argue that the most likely explanation for the observed compositions, and for the absence of co-existing hydrous minerals, is that the carbonates were formed by reactions between hot (>650°C), CO_2-rich fluids and the ultramafic host rock during an impact event. Impact processes on the Martian surface can produce both the hot, CO_2-rich fluid and the conduits through which it flowed. Impact metasomatism is also consistent with the observed oxygen isotope disequilibrium, sequence of mineral formation, and carbonate mineral zoning. These suggest carbonate formation during rapid cooling from high temperatures rather than prolonged exposure to low-temperature fluids. (Auth. mod.)

E-55247

Mateu, G., **Foraminifera, biofacies and sedimentary hydrodynamics in Antarctica** [Foraminíferos, biofacies e hidrodinámica sedimentaria en la Antártida], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.120-127, In Spanish with English summary. 15 refs.

DLC G845.S93

During the 1986-1987 "Antártida 86 11" expedition, 5,814 foraminifera representing 148 species and 26 families were collected at 67 stations of the Scotia Sea and the northwestern Weddell Sea. Based on the micropaleontological characteristics of these sediments, three areas of microfaunistic biofacies were determined and are described.

E-55257

Martí, J., Baraldo, A., Rey, J., **Origin and structure of Deception I.** [Origen y estructura de la isla Decepción (islas Shetland del Sur)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.187-194, In Spanish with English summary. 11 refs.

DLC G845.S93

Geological and geophysical data obtained during the 1987-89 antarctic expeditions to Deception I. enabled the authors to establish the structure of the island's caldera and to determine its origin as a consequence of the collapse of several pre-existing volcanic edifices.

E-55258

Valentín, A., Martini, M., Díez Gil, J.L., **Geochemistry of fluids on Deception I.** [Geoquímica de fluidos en isla Decepción], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.195-198, In Spanish with English summary. 5 refs.

DLC G845.S93

Samples from fumaroles and thermal springs of Deception I. have been collected. On the basis of their chemical compositions, a thermal anomaly connected to an underlying magma body and mainly distributed along the northern and eastern portions of the island can be derived; the same area represents the most probable location of the next volcanic activity. The phreato-magmatic character of the recent episodes is hypothesized as the result of a magma intrusion into shallow and confined water-saturated layers. The gaseous geothermometries show a formation temperature higher than 250°C, with a flowing of about 100°C. (Auth.)

E-55259

Risso, C., Aparicio, A., Viramonte, J.G., **Volcanic rock enclaves of Kendall Terrace and Murature Bay** [Los enclaves de las rocas volcánicas de Terraza Kendall y Bahía Murature. Isla Decepción, Shetland del Sur, Antártida], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.199-202, In Spanish with English summary. 6 refs.

DLC G845.S93

During the 1988-1989 international "Vulcantar" project, a detailed study of volcanic rocks was carried out in the northern area of Deception I. From geochemical and mineralogical analyses, two different types of xenoliths were determined: gabbroic xenoliths, consisting of cumulate crystals, and lithic xenoliths, consisting of different types of lava collected from the walls of volcanic conduits. No mantle-derived xenoliths were found in the area studied.

E-55260

Ramos, M., Ortiz, R., Díez Gil, J.L., Viramonte, J.G., **Thermal anomalies of the Deception volcano** [Anomalías térmicas y balance de flujo energético sobre el suelo del volcán Decepción. Isla Decepción (Shetland del Sur)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.203-219, In Spanish with English summary. 7 refs.

DLC G845.S93

A series of measurements were made during the 1987-88 and 1988-89 Spanish Antarctic expeditions to study the superficial thermal anomalies of the Deception volcano. Geophysical data suggest that the different sources are either conductive or convective in origin. Global energy interchange between the antarctic environment and the volcanic ground are discussed. (Auth.)

E-55261

Ramos, M., Domínguez, M., Ortiz, R., **Thermodynamics of the Deception volcano's soil** [Caracterización de algunos parametros termodinamicos del suelo del volcán Decepción (Antártida)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.220-223, In Spanish with English summary. 5 refs.

DLC G845.S93

Experimental values for thermophysical properties of the ash from Deception I. were determined during the 1988-89 Spanish Antarctic Expedition. The following thermophysical properties were measured: density, thermal conductivity, specific heat, thermal diffusivity, and film coefficient. Results are discussed and presented in graphs. (Auth. mod.)

E-55268

Rey, J., de Andrés, J.R., Fernández López, J.M., **Recent tectonics in the submarine deposits of the Deception I. bay** [Tectónica reciente en los depósitos submarinos de la bahía de Decepción], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.258-270, In Spanish with English summary. 8 refs.

DLC G845.S93

Deception I. is an active volcano with a sea-flooded caldera known as Port Foster. The volcanic history of the island is related to the evolution of a marginal basin associated with the south end of the Bransfield rift. Continuous seismic reflection profiles realized during two antarctic cruises, Exantarte 87-88 and Exantarte 88-89, show the existence of recent neotectonics associated with deep fault reactivation. From these records, the authors present a morphostructural interpretation of submarine volcanic units. The tectonic and structural schemes indicate that Quaternary distension is continuing. (Auth. mod.)

E-55289

Ellis-Evans, J.C., Wynn-Williams, D., **Great lake under the ice,** *Nature,* June 20, 1996, 381(6584), p.644-646, 7 refs.

This article and the article by C.R. Bentley included in it, both focus on different aspects of the work of the Kapitsa group in reexamining earlier investigations of the large sub-surface lake known as Lake Vostok. The startling conclusions of the size of the lake being comparable to Lake Ontario and in depth to that of Lake Baikal were quite unexpected. The fact of there being a large lake beneath the Vostok ice has raised numerous questions about what life forms were present and moving about, what sort of circulation moves and sustains these microbial forms, and what geochemical regime exists. In order not to disturb whatever is in the lake and to maintain its pristine nature it has been recommended that current drilling at Vostok be stopped at least 25 m above the lake surface.

E-55290

Bentley, C.R., **Water kept liquid by warmth from within,** *Nature,* June 20, 1996, 381(6584), p.645.

(See the abstract of Ellis-Evans, J.C., Great lake under the ice, *ibid.*, p.644).

E-55293

Richards, P.C., Gatliff, R.W., Quinn, M.F., Fannin, N.G.T., **Petroleum potential of the Falkland Islands offshore area,** *Journal of petroleum geology,* Apr. 1996, 19(2), p.161-182, Refs. p.180-181.

Rocks of Precambrian, Palaeozoic and Early Mesozoic ages are present on the Falkland Is. The islands are surrounded by extensive Mesozoic-Cenozoic basins that developed as failed rift systems during the initial stages of Gondwana separation. Large tracts of acreage in three of these basins (the Falkland Plateau Basin, South Falkland Basin and North Falkland Basin) were opened for licensing for the first time in Oct. 1995. The area has undergone little exploration other than the acquisition of regional seismic data, and interpretations of stratigraphy and basin history are therefore somewhat conjectural. The basins are believed to contain Jurassic to earliest Cretaceous syn-rift sediments. Probable marine and lacustrine source rocks, and reservoir rocks eroded from clean Palaeozoic quartzites, are predicted to occur within this syn-rift succession. The region is considered to be one of the World's last true "frontier" exploration areas, where large, deep, Mesozoic failed-rift basins remain to be drilled and explored. (Auth.)

E-55319

Scarrow, J.H., Pankhurst, R.J., Leat, P.T., Vaughan, A.P.M., **Antarctic Peninsula granitoid petrogenesis: a case study from Mount Charity, north-eastern Palmer Land,** *Antarctic science,* June 1996, 8(2), p.193-206, Refs. p.205-206.

At Mount Charity, Rb-Sr whole-rock dating has identified three successive phases of granitoid emplacement in Triassic (232±4 Ma), Jurassic (168 Ma), and Cretaceous (120±4 Ma) times. The Triassic suite comprises tonalites, granodiorites (including one two-mica granodiorite), monzogranite and a granite having either I-type or S-like mineralogies. The Jurassic suite includes only S-like granites, and the Cretaceous biotite tonalites and biotite granodiorite are all I-type. Mineralogical and compositional differences among the three suites suggest that different sources were tapped. All the granitoids are isotopically intermediate in composition between Palmer Land crust and depleted asthenosphere. The authors suggest that the I-type granitoids were produced by melting of meta-igneous crust; by contrast, the S-like granitoids represent partial melts of garnet-bearing sedimentary crust. (Auth. mod.)

E-55320

Tokarski, A.K., Doktor, M., Willan, R.C.R., Smellie, J.L., Sàbat, F., Muñoz, J.A., **Lithostratigraphy of volcanic and sedimentary sequences in central Livingston Island, South Shetland Islands,** *Antarctic science,* June 1996, 8(2), p.207-208, 9 refs.

This is a comment by the first two authors on the paper "Lithostratigraphy of volcanic and sedimentary sequences in central Livingston I, South Shetland Islands" (by J.L. Smellie, M. Liesa, J.A. Muñoz, F. Sàbat, R. Pallas and R.C.R. Willan, Antarctic science 7, 99-113) and a reply by the last four.

E-55323

Li, Z.N., Li, H.S., Shang, R.X., **Self-organization phenomenon of the nonequilibrium process in magmatism of the Fildes Peninsula, West Antarctica,** *Antarctic research (Chinese edition),* 1996, 8(1), p.9-20, In Chinese with English summary. 9 refs.

Volcanic, petrological and geochemical characteristics of the Tertiary volcanic rocks from the Fildes Peninsula were studied. These show that magma evolution was a process of dissipation of heat energy, exchanged energy and mass, occurring between the magma system and its surrounding environments, with features of dynamic equilibrium and periodicity (stage). The multi-grade complex texture of magmatic crystallization and the zonal structure in the high-level magma chamber are the self-organization phenomena in the non-equilibrium process of magmatism, also called the dissipative structure. (Auth.)

E-55324

Wang, D.D., Dai, C.D., Chen, Y.H., **Inspiration from study of antarctic meteorites. VII. New and unique meteorite types,** *Antarctic research (Chinese edition),* 1996, 8(1), p.21-36, In

Chinese with English summary. Refs. p.35-36.

The large number of meteorites from Antarctica and the desert areas of Australia, Africa and North America have changed the previous chondrite classification in recent years. The number of well established groups has increased from 9 to 13 (EH, EL, H, L, LL, R, CI, CR, Ch, CM, CO, CV and CK) and 3 new carbonaceous chondrite grouplets have been proposed. There are noticeable differences among chondrite groups in petrographic, mineralogical, chemical and O-isotopic characteristics. It is suggested that 13 chondrite groups can be divided into a carbonaceous chondrite family consisting of CI-CR-CH, CM-CO and CV-CK clans, and an enstitate-ordinary chondrite family consisting of EH-EL, H-L-LL and R clans. The carbonaceous chondrites are characterized by high oxidation state. (Auth.)

E-55325

Tang, Y.Q., Jiang, J.Z., Lu, B., Sui, L.R., **C_5-C_{15} hydrocarbon compounds in surficial sediments from the Bransfield Strait, Antarctica,** *Antarctic research (Chinese edition),* 1996, 8(1), p.37-46, In Chinese with English summary. 19 refs.

C_5-C_{15} hydrocarbon compounds have been studied in surficial sediments from the Bransfield Strait. They include alkane, iso-alkane, cyclohexane, aromatic and their substituted compounds. All samples contain large amounts of aromatic compounds, such as benzene, toluene, xylene and trimethyl benzene. Toluene is the dominant component. The ratio between benzene and hexane is 0.47-1.26. Differentiation of alkane, iso-alkane, cyclohexane and aromatic compounds was achieved by using R-type and Q-type factor analysis, as well as principal factor analysis. (Auth.)

E-55326

Wang, B.G., Hou, H.M., Tang, X.Z., Yuan, Y.R., **Paleomagnetic results of core NP93-2 from the Prydz Bay, Eastern Antarctica,** *Antarctic research (Chinese edition),* 1996, 8(1), p.47-52, In Chinese with English summary. 11 refs.

Two reversal geomagnetic excursions are detected by systematic paleomagnetic measurements of core NP93-2 from Prydz Bay. One is found in 60 to 67.5 cm from the top of the core, and the ^{14}C dating age of layer 67.5 cm to 72.5 cm is 10,315±800a B.P. It is estimated that the reversal geomagnetic excursion occurred at 9980-8880a B.P., and perhaps was the record of the Gothenburg geomagnetic excursion (ca 12,000a B.P.). The other is found in the 27.5-32.5 cm level, and ^{14}C dating age is 5390±600a B.P., with which no generally acknowledged reversal geomagnetic excursion can be compared. A few reports of reversal geomagnetic excursions in China can be used for comparison. (Auth. mod.)

E-55348

Dos Santos, P.R., Rocha-Campos, A.C., Trompette, R., Uhlein, A., Gipp, M., Simões, J.C., **Review of Tertiary glaciation in King George Island, West Antarctica: preliminary results,** *Pesquisa Antártica Brasileira,* July 1990, 2(1), p.87-99, Refs. p.98-99.

Tertiary glacial sediments of King George I. were studied in the summer of 1993, between Low Head and Lions Rump in King George Bay. Interpretation of a glacial origin for the sediments of the Krakowiak Glacier Member (Polonez Cove Formation, Early Oligocene) is supported by the finding of striae on top of the underlying basalt of the Mazurek Point Formation (Cretaceous). Dominant facies types are lenticular or tabular, mostly channelized bodies of coarse sandy, normal- and reverse-graded, matrix-supported conglomerates, sandy diamictites, and sandy mudstones. No evidence of deposition of basal tillite associated with the advance of the grounded ice was found. Structural data collected during field work also helped to test the available model of tectonic evolution of the area. One compressional and two extensional episodes were recognized on the basis of systematic measurement of joints and faults. The compressional episode is related to subduction of the Pacific Plate below the Antarctic Peninsula Plate ending at about 5 Ma. The first extensional episode may be associated with post-collision shear and opening of the Scotia Sea; the second extensional phase is probably related to the opening of the Bransfield Rift. (Auth. mod.)

E-55352

Goodge, J.W., Dallmeyer, R.D., **Contrasting thermal evolution within the Ross Orogen, Antarctica: evidence from mineral $^{40}Ar/^{39}Ar$ ages,** *Journal of geology,* July 1996, 104(4), p.435-458, Refs. p.455-458.

The Nimrod Group in the central Transantarctic Mountains and the Lanterman Metamorphic Complex in northern Victoria Land constitute internal metamorphic basement terrains of the Ross orogen that share many first-order similarities in lithology, structure, and metamorphism. However, new $^{40}Ar/^{39}Ar$ cooling ages determined for hornblende and muscovite from tectonites in the Geologists (Nimrod Group) and Lanterman ranges (Lanterman complex) indicate that these terrains experienced different post-kinematic cooling histories. These cooling ages indicate an average post-kinematic Lanterman cooling rate of ca. 30°C/m.y. The authors interpret the contrasting thermal histories of these terrains to lithosphere beneath the East Antarctic craton. In the central Transantarctic Mountains, Nimrod cooling rates indicate relatively modest post-tectonic denudation rates (ca. 0.4 mm/a), resulting from crustal thickening in an upper plate-margin setting. Contraction of adjacent continental-margin supracrustal sequences did not involve significant underthrusting, possibly as a result of a high component of margin-parallel translation. (Auth. mod.)

E-55386

Münker, C., Cooper, R.A., **Island arc setting of a New Zealand Cambrian volcano-sedimentary sequence: implications for the evolution of the SW Pacific Gondwana fragments,** *Journal of geology,* Nov. 1995, 103(6), p.687-700, 49 refs.

The Waingaro Fault Slice, one of several structural units of the early Paleozoic Takaka Terrane in Northwest Nelson, South I., New Zealand, consists of six fault-bounded subslices that represent different sections of a late Middle to early Late Cambrian volcano-sedimentary succession. Three basaltic to basaltic-andesitic suites and their volcaniclastic equivalents (150-500 m thick; previously mapped as Devil River Volcanics) are intercalated in a nonvolcanic sequence of turbiditic sandstones and siltstones (approximately 1800 m thick). Compositional systematics of the relatively immobile high field strength elements (HFSE) and rare earth elements (REE) as well as the depositional facies provide strong evidence for an island arc setting for the three basaltic to basaltic-andesitic suites. Comparable subduction-related Cambrian volcanics in most other fragments of southeast Gondwana (southeast Australia, Tasmania, and West Antarctica) are dominated by more evolved compositions. Volcanics of the Waingaro Fault Slice most closely resemble the predominantly basaltic Glasgow Volcanics of the early Paleozoic Bowers Terrane, Antarctica, consistent with their inferred close relationship in Cambrian time. (Auth. mod.)

E-55406

Storey, B.C., Macdonald, D.I.M., Dalziel, I.W.D., Isbell, J.L., Millar, I.L., **Early Paleozoic sedimentation, magmatism, and deformation in the Pensacola Mountains, Antarctica: the significance of the Ross Orogeny,** *Geological Society of America. Bulletin,* June 1996, 108(6), p.685-707, 89 refs.

Combined sedimentological, structural, and geochemical studies of a lower Paleozoic succession within the Pensacola Mountains suggest that it probably formed in a foreland basin setting during the Ross-Delamerian orogen, a complex early Paleozoic convergent margin of Antarctica and Australia. The lower Paleozoic succession lies unconformably on a deformed(?) Neoproterozoic sequence, referred to here as Sequence 1, and is divided into three unconformity-bounded sequences (Sequence 2-4). The oldest, Sequence 2, comprises Middle-Upper Cambrian platformal limestone (Nelson Limestone) and overlying Lower Ordovician silicic volcanic rocks of the Gambacorta Formation. Sequence 3, Wiens Formation, in part conformable with Sequence 2, represents deposition by unconfined ephemeral streams followed by a marine transgressive unit. (Auth. mod.)

E-55417

Lindstrom, M.M., **Antarctic meteorites: down to earth search for extraterrestrial materials,** Planetary geosciences—1988. Edited by M. Zuber, O. James, G. MacPherson and J. Plescia, Washington, D.C., U.S. National Aeronautics and Space Administration, 1989, p.82-83, NASA SP-498.

DLC QB603.G46P56 1989

During the last 15 years, the antarctic meteorite collection programs have provided a continuous supply of new extraterrestrial materials. These materials have yielded information on the origin and evolution of the Solar System. Continued collection of these fascinating rocks is expected to yield further valuable insights into the history of the Solar System. A brief review of these programs is provided.

E-55418

McKay, G.A., **Lewis Cliff 86010—a unique antarctic meteorite: possible new clues to the early history of the solar system,** Planetary geosciences—1988. Edited by M. Zuber, O. James, G. MacPherson, and J. Plescia, Washington, D.C., U.S. National Aeronautics and Space Administration, 1989, p.86-88, NASA SP-498.

DLC QB603.G46P56 1989

LEW 86010 is an extremely interesting antarctic meteorite of clear igneous origin, is probably closely related to ADOR, and most likely crystallized from a melt of its own composition. Consortia of investigators have been formed to study in greater detail the chronology, chemical and isotopic characteristics, cooling rate, and many other aspects of LEW 86010. All of these studies will be performed on a tiny sample, which is smaller than a marble (it weighs only 7 grams, or about 1/4 ounce), but which contains important clues to events that occurred during the birth of the Solar System.

E-55419

Mittlefehldt, D.W., **Ureilites: enigmatic meteorites that reluctantly yield their secrets,** Planetary geosciences—1988. Edited by M. Zuber, O. James, G. MacPherson, and J. Plecia, Washington, D.C., U.S. National Aeronautics and Space Administration, 1989, p.89-91, NASA SP-498.

DLC QB603.G46P56 1989

This review provides an outline of the major discoveries of and about antarctic ureilites, giving the isotopic and other important features that have been found, emphasizing why the features are important and the researchers who identified and examined the samples.

E-55420

Scott, E.R.D., **Discovery of a new kind of primitive meteorite: the unique chondrite, Allan Hills 85085,** Planetary geosciences—1988. Edited by M. Zuber, O. James. G. MacPherson, and J. Plascia, Washington, D.C., U.S. Aeronnautics and Space Administration, 1989, p.94-95, NASA SP-498.

DLC QB603.G46P56 1989

The discovery of the small antarctic meteorite called Allan Hills (ALH) 85085 is important for many reasons. Its constituent particles are remarkably different in size and composition from those in all other chondrites, and the rock itself comes from a previously unsampled part of the asteroid belt. The heating and aqueous alteration processes in asteroids that modified primitive particles and obscured their origins were milder for ALH 85085 than for almost all other chondrites. Finally, this chondrite is very fresh and has suffered very little weathering in Antarctica. It therefore offers a new window for the study of how and why infalling interstellar dust and gas around an infant star were converted into planets, asteroids, and people.

E-55433

Manley, W.F., ed, Jennings, A.E., ed, **Radiocarbon date list VIII: eastern Canadian Arctic, Labrador, northern Quebec, East Greenland shelf, Iceland shelf, and Antarctica,** *University of Colorado. Institute of Arctic and Alpine Research. Occasional paper,* 1996, No.50, 163p., Refs. p.119-124.

This Date List contains an annotated listing of 420 radiocarbon dates determined on samples from the eastern Canadian Arctic, Labrador, northern Quebec, East Greenland, Iceland, and Antarctica. Nearly two-thirds of the dates are on materials recovered from marine cores. The 22 radiocarbon dates from 10 western Ross Sea cores reported in this date list can be divided into three age groups: 20,000-30,000 BP, 7,000-12,000 BP, and <7000 BP. Dates from 20,000-30,000 ka B.P. only occur in glacial-marine diamictons in cores from the outer continental shelf. These dates have been interpreted to show that the Antarctic Ice Sheet did not ground on the outer shelf during the last glacial maximum. Dates in the second group, at 7,000-12,000 BP occur in cores in and near Drygalski Trough, north of the Drygalski Ice Tongue. These dates constrain deglaciation in the Terra Nova Bay region of the Victoria Land coast; the oldest date in this group is 11,440±90 BP, on decalcified marine sediments in an upper mud unit. The final group, comprising 10 dates of <7000 BP, occurs in seven cores across the western Ross Sea. Several of these dates coincide with diatom abundance spikes thought to represent peaks in diatom productivity during the Holocene. (Auth. mod.)

E-55443

Spigel, R.H., Priscu, J.C., **Evolution of temperature and salt structure of Lake Bonney, a chemically stratified antarctic lake,** *Hydrobiologia,* Mar. 22, 1996, 321(3), p.177-190, 34 refs.

Salinities in ice-covered antarctic lakes cover the range from freshwater to hypersaline brines. Recent measurements of salt composition and concentrations in Lake Bonney reveal little change below the chemocline since extensive measurements made in 1960-1961, although lake level has risen by approximately 5 m since then. The rise in lake level has resulted in a deepening of the freshwater layer above the chemocline. Temperature structure has adjusted to the effects of increased lake level on heat transfer processes such as transmission and absorption of solar radiation in the water column. Questions about how water-column stability affects biology in Lake Bonney have motivated the formulation of a method to compute density from *in situ* measurements of temperature, conductivity and pressure. The UNESCO Equation of State for seawater was modified to predict density at salinities greater than 42. The modifications merge smoothly with the UNESCO equations at a salinity of 42. At salinities below 42 the UNESCO equations give excellent predictions of density. (Auth.)

E-55473

Galindo-Zaldívar, J., Jabaloy, A., Maldonado, A., Sanz de Galdeano, C., **Continental fragmentation along the South Scotia Ridge transcurrent plate boundary (NE Antarctic Peninsula),** *Tectonophysics,* June 15, 1996, 258(1-4), p.275-301, 47 refs.

This study focuses on the analysis of the geological structure and recent evolution of the western sector of the South Scotia Ridge, Antarctic Peninsula. The authors provide new data that contribute to a better understanding of the geometry of the structures and the tectonic processes that occur around the transcurrent faults of the boundary between the Antarctic and Scotia plates. The geodynamic evolution of this area is constrained and related to the general geological evolution of the South Scotia Ridge. A correlation between seismic activity, present-day stresses, and the location and characteristics of faults and plate boundaries is also discussed. (Auth. mod.)

E-55476

Kelly, W.C., Zumberge, J.H., **Weathering of a quartz diorite at Marble Point, McMurdo Sound, Antarctica,** *Journal of geology,* July 1961, 69(4), p.433-446, 9 refs.

DLC QE1.J8

Complete chemical analyses of quartz diorite in six of its weathering stages were obtained at Marble Point, and the trends established by these data were correlated with the mineralogic changes. The only appreciable change involving an original constituent of the rock is the progressive oxidation of ferrous iron in pyrrhotite and biotite and the resulting formation of limonite which is responsible for the pronounced difference in color of the physically weathered debris. Seventy per cent of the original ferrous oxide is lost, and 45% of total iron oxide is leached from the rock. Small amounts of halite deposited by evaporation of sea spray and native sulfur, presumably derived from volcanic fumes of Mt. Erebus, are found in the more weathered materials at Marble Point. Their abundance relates to weathering only in that the disintegrated rock is physically more favorable to accumulation of these exotic substances. (Auth. mod.)

E-55514

Zastawniak, E., **Macroscopic plant remains from Upper Cre-**

taceous and Tertiary of King George I. [Makroskopowe szczątki roślin górnej kredy i trzeciorzędu na wyspie Króla Jerzego (Południowe Szetlandy, Zachodnia Antarktyda)], *Wiadomości botaniczne,* 1993, 37(3-4), p.217-219, In Polish with English summary. 7 refs.

Leaf impressions found in the Upper Cretaceous and Tertiary rocks of King George I. were collected during the Polish antarctic expeditions in 1977-1986. The oldest floras of Upper Cretaceous and Paleocene ages provide evidence for a warm climatic phase. Late Eocene through Early Oligocene floras indicate another warm period. The youngest floras of Oligocene-Miocene boundary age suggest a cool-temperate climate. (Auth. mod.)

E-55541

King, E.C., Bell, A.C., **Towed geophone system for use in snow-covered terrain,** *Geophysical journal international,* July 1996, 126(1), p.54-62, 16 refs.

A new type of drag cable has been developed, which was successfully used to collect seismic reflection data on an antarctic ice shelf. Standard geophone elements were encapsulated in polyurethane to form 25 m long, rectangular sections. The resultant towed array resembles a 300 m long flexible ski. The use of a towed cable provided substantial time and manpower savings over the use of planted geophones. In comparison with drag cables using gimballed geophones, the towed array has a much lower coefficient of friction due to its smooth profile, and it is therefore possible to tow an array using snowmobiles. This provides a significant advantage because a system can be deployed by ski-equipped light aircraft to areas that are difficult or impossible to access using large vehicles. Use of the array enabled a team of four people to acquire 158 km of single-fold seismic reflection data on the Ronne Ice Shelf over two field seasons. The data are the first to show sub-seabed structure beneath this major ice shelf. (Auth. mod.)

E-55543

Fitzsimons, S.J., **Formation of thrust-block moraines at the margins of dry-based glaciers, south Victoria Land, Antarctica,** *Annals of glaciology,* 1996, Vol.22, International Symposium on Glacial Erosion and Sedimentation, Reykjavik, Iceland, Aug. 20-25, 1995. Proceedings. Edited by D. Collins et al, p.68-74, 32 refs.

Several dry-based alpine glaciers in the Dry Valleys of south Victoria Land have prominent end moraines. Examination of their morphology, structure and sedimentology shows they consist of blocks of sand, gravel and organic silt within which sedimentary structures unrelated to entrainment and transportation by ice are well preserved. The nature and preservation of sedimentary structures, together with the presence of algae mats in the sediment, suggest formation by proglacial entrainment, transportation and deposition of frozen blocks of lacustrine sediment. Previous models appear inappropriate for cold, dry-based glaciers because their basal temperatures are well below freezing point and they rest on deep permafrost. Three alternative models for the formation of thrust-block moraines at the margins of dry-based glaciers are examined in this paper: block entrainment of sediment associated with frozen-bed deformation; entrainment by overriding and accretion of marginal-ice and debris aprons; and transient wet-based conditions associated with glaciers flowing into ice-marginal lakes. (Auth. mod.)

E-55544

Gow, A.J., Meese, D.A., **Nature of basal debris in the GISP2 and Byrd ice cores and its relevance to bed processes,** *Annals of glaciology,* 1996, Vol.22, International Symposium on Glacial Erosion and Sedimentation, Reykjavik, Iceland, Aug. 20-25, 1995. Proceedings. Edited by D. Collins et al, p.134-140, 11 refs.

Successful core-drilling to bedrock of both the Greenland and antarctic ice sheets offers unique opportunities for examining processes acting at the bed. At Byrd Station, penetration of the bed was accompanied by upwelling of glacial meltwater into the drillhole. The sediment confirms that incorporation of the debris occurred simultaneously with periodic "freeze-on" of basal meltwater. Currently, the presence of substantial meltwater at the ice/rock interface likely precludes any erosive activity at the bed. At GISP2 in Greenland, basal silty ice 13.1 m thick is currently frozen to the bed at -9°C. Limited studies of the silty ice at GISP2 together with results of more comprehensive investigations obtained by GRIP researchers on basal ice at a companion site at Summit, indicate that the sediment-bearing basal ice likely formed in the absence of an ice sheet and was therefore unrelated to direct interaction of the present ice sheet with its bed. The fact that the basal ice at Summit is frozen to the bottom also precludes any likelihood of erosive activity at the bed. (Auth. mod.)

E-55545

Crawford, K., Kuhn, G., Hambrey, M.J., **Changes in the character of glaciomarine sedimentation in the southwestern Weddell Sea, Antarctica: evidence from the core PS1423-2,** *Annals of glaciology,* 1996, Vol.22, International Symposium on Glacial Erosion and Sedimentation, Reykjavik, Iceland, Aug. 20-25, 1995. Proceedings. Edited by D. Collins et al, p.200-204, 19 refs.

Investigations of the stratigraphy and facies within a 2.69 m long gravity core from the southwestern Weddell Sea indicate a significant change in the character of glaciomarine sedimentation since grounded ice withdrew from the continental shelf. Based on visual description, X-radiography, clast shape, particle-size analysis, physical properties and geochemical data, the core used in this analysis comprises five distinct units, from top to bottom: (i) massive diamicton, (ii) weakly to well-stratified diamicton, (iii) millimeter-scale laminated muds, with little or no coarse-clastic input, (iv) well- to weakly stratified diamicton, (v) massive diamicton. Grounded ice decoupled from the continental shelf to form an ice shelf, probably initiated by a rise in sea level in response to global climatic changes. Following distintegration of the ice shelf, sedimentation was influenced by marked variations in iceberg production. AMS-derived ^{14}C ages from the upper 46 cm of the core indicate that the succession has been deposited since the end of the most recent glacial maximum (late Pleistocene). (Auth. mod.)

E-55546

Powell, R.D., Dawber, M., McInnes, J.N., Pyne, A.R., **Observations of the grounding-line area at a floating glacier terminus,** *Annals of glaciology,* 1996, Vol.22, International Symposium on Glacial Erosion and Sedimentation, Reykjavik, Iceland, Aug. 20-25, 1995. Proceedings. Edited by D. Collins et al, p.217-223, 20 refs.

A robotic submarine was used for the first observations of a grounding-line area of a floating glacier. The site was Mackay Glacier which terminates as a floating glacier tongue in the Ross Sea at latitude 77°S. Half of the 20 m thick basal debris layers in Mackay Glacier are deposited as subglacial till in the last 1.8 km that the glacier remains grounded. The other half of the basal debris is melted out up to 1.5 km in front of the grounding line, producing a sheet of glacimarine sediment as shelfstone diamicton and mud draped on subglacial till. Both till and glacimarine sediment may be turbated by icebergs. This simple model of till overlain by shelfstone diamicton and mud is a direct contrast to sedimentary depositional systems at tide-water termini of temperate glaciers. (Auth. mod.)

E-55548

Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991, Findlay, R.H., ed, Unrug, R., ed, Banks, M.R., ed, Veevers, J.J., ed, **Gondwana eight: assembly, evolution and dispersal,** Brookfield, VT, A.A. Balkema Publishers, 1993, 623p., Refs. passim. For selected papers see E-55549 through E-55571.

This volume, whilst presenting new data on the aspects of Gondwana geology, also highlights the increasing international interest as to how the Gondwana supercontinent was assembled. This facet of Gondwana geology is directly concerned with major tectonic processes of the earth; it addresses the fundamental problem of whether or not plate tectonic processes were operating in Late Proterozoic times. The book is organized according to three themes: Assembly, introducing the Late Proterozoic-Early Paleozoic mobile belts of Gondwana; Evolution, covering detailed palynological and paleontological research of Late Paleozoic-Mesozoic times, including paleoclimate and the evolution of the Gondwana basins; and Dispersal, presenting a novel approach to predicting past plate motions followed by a series of papers covering the break-up history of Gondwana through work on the Mesozoic thermal history, faulting and aspects of the fossil landscape of Gondwana.

E-55549

Unrug, R., **Gondwana supercontinent: Middle Proterozoic crustal fragments, Late Proterozoic assembly, and unresolved problems,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.3-8, Refs. p.6-8.

The Late Proterozoic supercontinent cycle includes the break-up of an earlier Middle Proterozoic supercontinent, and the accretion of several cratons and the large East Gondwana continent to form Gondwanaland. The accretion can be analyzed in terms of plate tectonics. Early collisional events started at 870 Ma; the main tectonothermal events were in the 650-500 Ma range. The 500-450 Ma thermal events postdate the supercontinent assembly. (Auth.)

E-55550

Li, Z.X., Powell, C.M., **Late Proterozoic to Early Paleozoic paleomagnetism and formation of Gondwanaland,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.9-21, Refs. p.18-21.

Late Proterozoic to Early Paleozoic paleomagnetic data from the major Gondwanan continents have been reviewed to examine the tectonic relationship between the continents over this time interval, and, if possible, to determine when Gondwanaland was formed. The paleomagnetic data have been graded into 5 classes according to their quality/reliability, and only data of the top 3 classes have been used. Although reliable data for the Late Proterozoic interval are scarce, they indicate that India and cratonic Australia had been together since at least 730 Ma; there could have been significant relative movements between the West Gondwanan cratonic blocks during the Late Proterozoic; and there was a wide ocean between eastern Africa and East Gondwanaland during the Cambrian. It is suggested that Gondwanaland was amalgamated during the Pan-African Orogeny. (Auth.)

E-55551

Yoshida, M., Vitanage, P.W., **Review of the Precambrian geology of Sri Lanka and its comparison with Antarctica,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.97-109, Refs. p.106-109.

The Precambrian rocks of Sri Lanka form principally three geologic units: the Wanni Complex, the Highland Group, and the Vijayan Complex. They were deformed and metamorphosed mainly during the Proterozoic although a relic Archaean history is known in part of the Highland Group. In East Antarctica between Enderby Land and central Queen Maud Land there developed six Proterozoic units. They have generally similar tectonothermal histories and form one geotectonic unit (the Rayner Belt). According to the distribution mode of different geologic units in Antarctica along with their structural relationships, Sri Lanka was probably joined to the Lützow-Holm Bay area of Antarctica. This involves the probable correlation of the Wanni Complex, the Highland Group, and the Vijayan Complex of Sri Lanka with the Prince Olav Complex, Ongul and Skallen groups, and the Yamato-Belgica Complex of Lützow-Holm Bay area respectively. (Auth.)

E-55552

Groenewald, P.B., **Correlation of cratonic and orogenic provinces in southeastern Africa and Dronning Maud Land, Antarctica,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.111-123, Refs. p.120-123.

Crustal evolution in western Queen Maud Land was essentially the same as that in southeastern Africa from the Archaean until Mesozoic, and suggests progressive assembly of this portion of Gondwana prior to 1,000 Ma. Mid-Proterozoic supracrustal sequences of the cratonic Kaapvaal and Zimbabwe Provinces of Africa and the Grunehogna Province of Queen Maud Land are similar in lithological succession, age and inferred depositional setting. Both continents are transected by 1,000 Ma orogenic belts. The Maudheim Province in Queen Maud Land, an orogenic belt to the south and east of the Grunehogna Province, is comparable to the Mozambique and Natal provinces in southeastern Africa. All three have attributes of metamorphosed volcanic arc-marginal basin successions, and thermotectonic histories indicating that 1,000 Ma collision was a major stage in the assembly of Gondwana. (Auth. mod.)

E-55553

Stüwe, K., Sandiford, M., **Preliminary model for the 500 Ma event in the East Antarctic Shield,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.125-130, Refs. p.129-130.

Most rocks from the East Antarctic Shield preserve structures, mineralogies and mineral compositions that record granulite facies metamorphic events during Proterozoic and Archaean times. However, there is independent evidence that the shield experienced a major tectono-thermal event during the Early Cambrian. This evidence includes the pervasive resetting of isotopic signatures of the Precambrian gneisses, of Cambrian ages for many undeformed granites, of greenschist metamorphic assemblages and shear zones of this age and Phanerozoic fission track ages. The event is also indirectly indicated by the nature of the Proterozoic events because most tectonic models derived for these events are insufficient to explain complete exhumation of these rocks. The combined evidence suggests that a tectono-thermal event during the Cambrian may have exhumed the East Antarctic Shield and adjacent parts of Gondwana from as deep as 10-15 km. Nevertheless, there is no obvious pervasive deformation associated with this event. Substantial basaltic underplating during a period of minor lithospheric thinning may have been responsible for this exhumation. (Auth.)

E-55554

Flöttmann, T., Kleinschmidt, G., Funk, T., **Thrust patterns of the Ross/Delamerian orogens in northern Victoria Land (Antarctica) and southeastern Australia and their implications for Gondwana reconstruction,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.131-139, Refs. p.137-139.

Contractional faults characterize the boundaries of the terranes along the eastern craton edges of southeastern Australia and northern Victoria Land. East-directed displacement kinematics prevail at the eastern margins of the orogenic belts and similar foreland thrust belts mark the western orogen margins. The structural patterns represent similar imprints of Cambro-Ordovician tectonism, and therefore give evidence of a continuous convergent Palaeo-Pacific Gondwana margin in Australia and Antarctica. These patterns can be used to delimit Australian-Antarctic Gondwana reconstructions. (Auth.)

E-55555

Kamenev, E.N., **Structure and evolution of the Antarctic shield in Precambrian,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.141-151, Refs. p.150-151.

The following major structural types are created by the Precambrian tectonic environments of the antarctic shield: Archean protocratonic blocks; Proterozoic Wegener-Mawson mobile belt; and Late Proterozoic sedimentary-volcanogenic protoaulacogens. Each type reflects successive stages of evolution of the antarctic shield in Precambrian. Protocratonic blocks were formed between 3900 and 2700 Ma, when the environments of the charnockite-enderbite nuclei and of the granite-greenstone terranes dominated. The Wegener-Mawson mobile belt strikes throughout East Antarctica from east to west. It was formed between 2500 and 500 Ma, when the environments of granulite-gneiss terranes dominated. A polycyclic evolution with 4 cycles of tectonic activity culminating at 2400, 1700, 1000 and 550 Ma is a very important feature of this mobile belt. Metamorphic prograde and retrograde zoning in the mobile belt is best explained by its nappe-block structure, caused by accretion, collision and amalgamation of protocratons. (Auth.)

E-55556

Sergeev, M.B., Kaulio, V.M., **High-grade metamorphic rocks of the northern Prince Charles Mountains, East Antarctica: their subdivision and history,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.153-160, 6 refs.

Magnetic susceptibility weighed by rock volume can be used to separate two rock series in the Prince Charles Mts.: Larsemann Series has low values generally between 0.0001 to 0.001 SI, while Reinbolt Series generally has high values between 0.001 and 0.1 SI. The difference in magnetic susceptibility reflects a difference in the amount of magnetite, which is due to a different origin and premetamorphic history. The Larsemann Series is thought to be older supracrustal rocks, generally underlain by younger plutonic Reinbolt Series. The present horizontal distribution of rocks is attributed to vertical movements on E to ENE trending faults exposing Reinbolt Series in elongate fault blocks. (Auth.)

E-55557

Katz, M.B., **Kannack complex of the Vietnam Kontum massif of the Indochina block: an exotic fragment of Precambrian Gondwanaland?,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.161-164, 11 refs.

Precambrian granulite facies rocks occur over an area of 100 km in the eastern part of the Kontum Massif of Vietnam. In the reconstruction of Precambrian Gondwanaland a granulite facies mobile belt can be traced from Sri Lanka, India and Antarctica through to Australia. The tectonic history of the Indochina Block in the Precambrian is debatable, however some latest Precambrian paleotectonic interpretations join this block and the Tibetan, Chinese and Iranian Blocks with Precambrian Gondwanaland. (Auth. mod.)

E-55558

Webb, J.A., Fielding, C.R., **Permo-Triassic sedimentation within the Lambert Graben, northern Prince Charles Mountains, East Antarctica,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.357-369, Refs. p.367-369.

The only substantial occurrence of Palaeozoic strata in East Antarctica is the Amery Group, which crops out around Beaver Lake in the northern Prince Charles Mountains, on the western margin of the Lambert Graben. The uppermost unit of the Amery Group is the Flagstone Bench Formation; this is over 550 m thick, and apparently conformably succeeds the underlying Mid- to Late Permian Bainmedart Coal Measures. The Flagstone Bench Formation is dominated by trough cross-bedded, coarse-grained quartz-feldspathic sandstones, apart from the Jetty Member (here defined), which lies more or less in the middle of the formation, and contains abundant red-purple and olive colored siltstones, frequently displaying large scale desiccation mud-cracks. The sandstone unit beneath the Jetty Member contains a Mid- to Late Permian microflora (Stage 5), and overlying the Jetty Member are siltstone beds with a Late Triassic megaflora containing *Dicroidium zuberi, Dicroidium crassinervis* forma *stelznerianum* and a ?voltzialean conifer. (Auth. mod.)

E-55559

Elliot, D.H., Larsen, D., **Mesozoic volcanism in the central Transantarctic Mountains, Antarctica: depositional environment and tectonic setting,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.397-410, Refs. p.408-410.

Pyroclastic and related rocks of silicic and basaltic composition form an important part of the uppermost Beacon Supergroup in the central Transantarctic Mountains. The Upper Triassic to Lower Jurassic Falla Formation consists of a sandstone-carbonaceous shale sequence succeeded by a sequence increasingly dominated by silicic tuffs. This volcaniclastic sequence is overlain by basaltic pyroclastic and laharic deposits of the Prebble Formation. The pyroclastic eruptions were abruptly followed by early Middle Jurassic flood-basalt eruption (Kirkpatrick Basalt). The pyroclastic deposits were the result in part of Plinian and phreatomagmatic processes. Monoclinal structures, indicative of basement uplifts, affected the sequence in the Early to Middle Jurassic. Development of topography is also indicated by thick sequences of mass-flow (laharic) deposits, the occurrence of arkosic grits in the lower part of the volcaniclastic sequence and ponded lavas in the overlying basalt sequence. (Auth. mod.)

E-55560

Fleming, T.H., Elliot, D.H., Foland, K.A., Jones, L.M., Bowman, J.R., **Disturbance of Rb-Sr and K-Ar isotopic systems in the Kirkpatrick Basalt, north Victoria Land, Antarctica: implications for middle Cretaceous tectonism,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.411-424, Refs. p.420-424.

Chemical and isotopic variations in an Fe-rich lava flow which caps the Kirkpatrick Basalt lava sequence in north Victoria Land provide evidence for middle Cretaceous alteration. ^{40}Ar/^{39}Ar incremental heating analyses of plagioclase separates yield good plateaus, firmly establishing an age of 177 Ma for the flow and providing a minimum age for the entire lava sequence. On a Rb-Sr isochron diagram, whole-rock samples from this flow define a 103 Ma array whereas magnetically separated fractions from a single sample fall along a different 165 Ma trend. The whole-rock Rb-Sr isotopic data are interpreted to reflect an episode of alteration during the middle Cretaceous. Disturbance of the K-Ar system at this time is reflected in low dates resulting from Ar loss. Several paleomagnetic studies of the Ferrar Group in north Victoria Land report anomalous pole positions which may also reflect alteration during the middle Cretaceous. (Auth. mod.)

E-55561

Kelly, S.R.A., **Biofacies and biostratigraphic constraints on regression in the uppermost Fossil Bluff Group (Aptian-Albian), Alexander Island, Antarctica,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.425-437, Refs. p.433-435.

An estimated 7 km of fore-arc basin sediments are now placed in the Fossil Bluff Group (Late Jurassic-Early Cretaceous) of Alexander I. In the present study only the uppermost strata of Aptian to Albian age are examined, comprising the Pluto Glacier and Neptune Glacier formations. Environments range from offshore marine shelf to onshore fluvial. In shallowing order, six biofacies are identified: heteromorph ammonite, *Aucellina* bivalve, inoceramid bivalve, trigoniid bivalve biofacies, *Cruziana* ichnofacies, and forest. Regression commenced in the Aptian and climaxed in the Late Albian when gymnosperm forests were established in a fluvio-lacustrine environment. (Auth.)

E-55562

Visser, J.N.J., **Reconstruction of the late Palaeozoic ice sheet on southwestern Gondwana,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.449-458, Refs. p.456-458.

Analysis of the palaeogeography, spatial and temporal distribution of glacial erosion features and lithofacies, and plate tectonic history of the region enables the reconstruction of the Permo-Carboniferous ice sheet at specific time intervals on southwestern Gondwana. During the Early to Mid-Carboniferous, small mountain ice centers formed along the northern sector of the tectonic arc and in South America. Growth of ice centers in South America, Africa and Antarctica since the Mid-Carboniferous resulted in the formation of a supercontinental ice sheet having dimensions of about 10,000 by 7,000 km. The major ice-spreading center straddled Africa and Antarctica. Large sections of South America and part of the Sowegon basin became ice free during the Early Permian. Sea-level and climatic changes at the end of the Early Permian caused the collapse of the ice sheet and only small highland ice caps were maintained in Africa and possibly Antarctica in the Late Permian. (Auth.)

E-55564

Sahagian, D.L., Collinson, J.W., **Gondwanan foreland basin along the Panthalassan margin of Antarctica,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.497-506, Refs. p.505-506.

Permo-Triassic rocks in the Transantarctic Mountains and Permian rocks in the Ellsworth Mountains were deposited in a foreland basin in front of the Gondwanan fold-thrust belt. Evidence supporting this hypothesis includes the thickening of comparable sections toward West Antarctica and paleocurrent and lithologic data suggesting a calc-alkaline volcanic source in West Antarctica. Gondwana basins in Victoria Land are relatively small and their size is well constrained, suggesting a width of about 200 km. A cross-sectional width of the foreland basin in the Central Transantarctic Mountains is at least 400 km. The Ellsworth Mountains-Pensacola Mountains segment of the basin, which includes folded Permian rocks, is about 1100 km wide. The reconstructed 200 km Permian width of this segment, when added to the Central Transantarctic Mountains width, yields a basin width of 600 km. The Triassic width of the foreland basin, excluding the folded rocks of the Ellsworth-Pensacola Mountains, but now including the Central Transantarctic Mountains and Victoria Land, was also 600 km wide. (Auth. mod.)

E-55565

Lee, T.F., **Determination of the positions of the Gondwana continents back to the Ordovician using a method of plate path plotting,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.523-529, 6 refs.

It is argued that one may derive by trial and error a simple rule which allows plotting of the paths of the continental plates back through Phanerozoic time. The only assumption required is that the rotation/magnetic axes relationship has been approximately constant during this time and that accurately determined and dated, not-too-widely spaced palaeomagnetic poles for each plate are used. Because there are several gaps in palaeomagnetic pole data, only approximate plotting can be done at present for the Gondwana continents. Ten maps are presented showing the probable distribution of the Gondwana continents at different times from Middle Ordovician to Upper Cretaceous. A study of these maps allows an explanation of the distribution of the Palaeozoic glaciation across Gondwanaland. (Auth. mod.)

E-55566

Mikhal'skiĭ, E.V., Andronikov, A.V., Beliatskiĭ, B.V., Kamenev, E.N., **Mafic and ultramafic igneous suites in the Lambert-Amery rift zone,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.541-546, 12 refs.

The dyke swarms in Vestfold Hills, Mawson Escarpment, Mt. Collins, Beaver Lake area, plutons at Mt. Willing and Mt. Collins, stocks and sills in Jetty Peninsula are considered as manifestations of deep-seated thermal processes affecting the lithosphere in Proterozoic and in Phanerozoic time. Proterozoic igneous rocks are mostly tholeitic. The Phanerozoic igneous rocks are confined to alkaline series. Late Palaeozoic dykes of alkaline dolerites and alkaline lamprophyres are widespread in the Beaver Lake area. This igneous event directly predates the formation of paleorift graben filled by Permian sequence. A Cretaceous complex of K-Na alkaline-ultrabasic rocks in Jetty Peninsula intruded into Precambrian metamorphic rocks and Palaeozoic sedimentary strata. Formation of this complex is believed to record a middle stage of Gondwana breakup. (Auth. mod.)

E-55567

Andronikov, A.V., Egorov, L.S., **Mesozoic alkaline-ultrabasic magmatism of Jetty Peninsula,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.547-557, 14 refs.

Detailed geological and petrological studies of small alkaline-ultrabasic intrusions have been carried out in the Jetty Peninsula region. These intrusions include 6 dykes, 7 stocks and 2 sills forming a submeridional chain over 40 km long. The main conclusions drawn from these studies are: all the subisometric in plan intrusive bodies of Jetty Peninsula represent small polyphase stocks with analogs in Paraguay, South Africa and Australia; Mesozoic alkaline-ultrabasic magmatism is associated with the middle stages of Gondwana break-up; all polyphase stocks have the same sequence of the emplacement; and the alkaline ultrabasic rocks of Jetty Peninsula contain a great number of mantle nodules: garnet-bearing and spinel lherzolites, garnet-free harzburgites, dunites and wehrlites. Three types of mantle material are recognized: "fertile", "depleted" and enriched LREE (resulting from mantle metasomatism). (Auth. mod.)

E-55568

Egorov, L.S., Andronikov, A.V., **Prospects of mineral detection associated with alkaline-ultrabasic rocks (Prince Charles Mountains),** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.559-562, 14 refs.

Manifestations of alkaline-ultrabasic rocks in the northern Prince Charles Mountains were studied during the 1986-87 summer field season. It was established that all the intrusive bodies can be classified as melilite lamprophyres, alkaline picrites and ultrabasic foidites. Elsewhere small diamond grains of no economic significance were found in similar rocks. The following conclusions are based on detailed studies of the antarctic alkaline-ultrabasic rocks, analyses of the geological structure of the region, and correlation with similar intrusive bodies of other regions of the world: the region between 71° and 73°S is the most promising for the discovery of diamond-bearing rocks; and tuffaceous breccias from stock-like bodies of alkaline ultrabasic rocks in the Jetty Peninsula could contain accessory diamonds. (Auth. mod.)

E-55569

Wilson, T.J., **Jurassic faulting and magmatism in the Tran-**

santarctic Mountains: implications for Gondwana breakup, Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.563-572, Refs. p.570-572.

New structural mapping in the southern Victoria Land and Beardmore Glacier regions of the Transantarctic Mountains has documented the regional development of Jurassic normal faulting and consistent Jurassic Ferrar dolerite dike trends. Dikes form two subperpendicular sets with northwest and east-northeast trends. Two sets of conjugate normal faults, subparallel to the dike trends, are developed in both areas. Because the subperpendicular dike and fault sets formed contemporaneously, these orientation patterns document a regionally consistent Jurassic triaxial strain field characterized by both northeast-southwest and northwest-southeast extension. The parallelism between the Jurassic structural trends within the Transantarctic Mountains and offshore basins in the Weddell and Ross embayments suggests that these basins may have initially formed in the Jurassic, within a zone of failed rifting that transected the antarctic sector of Gondwana. (Auth. mod.)

E-55570

Foster, D.A., Gleadow, A.J.W., **Architecture of Gondwana rifting in southeastern Australia: evidence from apatite fission track thermochronology,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.597-603, Refs. p.602-603.

Apatite fission track data indicate that the boundary between the Kanmantoo and Lachlan Fold Belts in western Victoria, Australia was reactivated as a transfer fault during Mesozoic rifting. Reactivation of this zone of crustal weakness probably determined the location of the Tasman Fracture Zone of the southeast Indian Ridge, controlled the shape of the Otway Basin, and influenced the Cretaceous denudation history of western Victoria. When Australia and Antarctica are reconstructed along the trace of the Tasman Fracture Zone the reactivated tectonic boundary in Victoria lines up with the Leap Year Fault in northern Victoria Land. The existence of this tectonic boundary and its effect in deflecting the southeast Indian Ridge to the south of Tasmania probably prevented Cretaceous rifting in Bass Strait from becoming sea-floor spreading. Without this transfer structure Tasmania would have remained attached to Antarctica rather than to Australia. (Auth.)

E-55571

Arne, D.C., Kelly, P.R., Brown, R.W., Gleadow, A.J.W., **Reconnaissance apatite fission-track data from the East Antarctic Shield,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.605-611, 21 refs.

The low-temperature (i.e.<120°C) thermal history of the East Antarctic Shield has been assessed by apatite fission-track analysis of 42 Precambrian outcrop samples. Fission-track ages for these samples range from 466±20 Ma to 153±3 Ma and mean track lengths vary from 14.40 μm to 12.41 μm. The variability in the relationship between apatite fission track age and mean track length in data from various geographical regions suggests differences in types of cooling during the Phanerozoic. Samples from the continental margin east of Prydz Bay are inferred to have cooled during the late Palaeozoic and early Mesozoic between 300 and 200 Ma, while samples from the Prince Charles Mountains and from the continental margin west of Prydz Bay are inferred to have cooled more recently in the Mesozoic, at 150 Ma. Evidence for cooling during the Mesozoic at 150 Ma is attributed to exhumation associated with the early stages of Gondwana break-up. (Auth. mod.)

E-55575

Birkenmajer, K., **Geology of Gerlache Strait, West Antarctica. I. Arctowski Peninsula,** *Polish polar research,* 1995, 16(1-2), p.47-60, With Polish summary. 19 refs.

The rocks exposed along the western coast of Arctowski Peninsula, on offshore islands and Danco Coast, represent the following lithostratigraphic units: the Trinity Peninsula Group metasediments (?Permian-Triassic); the Antarctic Peninsula Volcanic Group lavas, agglomerates and tuffs (Lower Cretaceous); the Andean Intrusive Suite, including adamellite, granite, granodiorite, diorite, tonalite and gabbro plutons (mid-Cretaceous), and basic and acid hypabyssal dykes (?Upper Cretaceous). The relationships between these rock-units are shown in a geological map and sketches of field exposures. (Auth.)

E-55599

Ricci, C.A., Talarico, F., Palmeri, R., Di Vincenzo, G., Pertusati, P.C., **Eclogite at the Antarctic palaeo-Pacific active margin of Gondwana (Lanterman Range, northern Victoria Land, Antarctica),** *Antarctic science,* Sep. 1996, 8(3), p.277-280, 17 refs.

Well-preserved eclogites were found for the first time in Antarctica, at the Lanterman Range. They are part of a mafic-ultramafic belt that lies between the Wilson Terrane, representing part of the palaeo-Pacific margin of Gondwana, and the Bowers Terrane, a Cambro-Ordovician volcanic arc and related sediments accreted to the margin during the Ross Orogeny. The eclogites formed at temperatures in the range 750-850°C and pressures above 15 kbar and subsequently experienced a decompressional path to low pressure amphibolite facies conditions. The formation and exhumation of eclogites and the attainment of the metamorphic peak in adjacent rock units is consistent with a plate convergent setting model at the palaeo-Pacific margin of Gondwana. (Auth.)

E-55601

King, E.C., **New observations about the Latady basin from the Orville Coast, Antarctic Peninsula,** *Antarctic science,* Sep. 1996, 8(3), p.287-288, 7 refs.

A series of small cliffs on the southeastern side of Dodson Peninsula, Orville Coast are the most remote rock exposures in the southeastern extremity of the Antarctic Peninsula. Never previously visited, the opportunity to approach the exposures was taken during oversnow seismic investigations in Jan. 1993. The cliffs were first identified by aerial photography and marked on the *Antarctica Sketch Map, Ellsworth Land-Palmer Land* (U.S.G.S. 1969). The rocks in the cliff were of two colors, dark grey and light buff. The dark grey rock forms the lowest and highest parts of the face with the buff material between them. The buff rock formed a steeper face than the dark material, as seen on the most northerly outcrop, which presented a profile to the observation point.

E-55606

Mensing, T.M., Faure, G., **Cretaceous alteration of Jurassic volcanic rocks, Pain Mesa, northern Victoria Land, Antarctica,** *Chemical geology,* June 14, 1996, 129(1-2), p.153-161, 14 refs.

The Kirkpatrick basalt (Jurassic) of Pain Mesa in the Mesa Range of northern Victoria Land consists of low-Ti tholeiite basalt overlain by up to six flows of hypocrystalline, high-Ti tholeiite. The Rb and Sr concentrations and $^{87}Sr/^{86}Sr$ ratios of 28 specimens of high-Ti basalt from Pain Mesa yield an anomalously low errorchron date of 100±15 Ma, in contrast to whole-rock samples of the low-Ti tholeiites which scatter above and below a 175 Ma reference isochron. The apparent lowering of the Rb-Sr date of the high-Ti flows is attributed to aqueous alteration of the rocks and coincides with the separation of Australia from Antarctica during the Cretaceous. (Auth.)

E-55622

McKay, D.S., et al, **Search for past life on Mars: possible relic biogenic activity in Martian meteorite ALH84001,** *Science,* Aug. 16, 1996, 273(5277), p.924-930, 88 refs.

Fresh fracture surfaces of the Martian meteorite ALH84001 contain abundant polycyclic aromatic hydrocarbons (PAHs). These fresh fracture surfaces also display carbonate globules. Contamination studies suggest that the PAHs are indigenous to the meteorite. High-resolution scanning and transmission electron microscopy study of surface textures and internal structures of selected carbonate globules show that the globules contain fine-grained, secondary phases of single-domain magnetite and Fe-sulfides. The carbonate globules are similar in texture and size to some terrestrial bacterially induced carbonate precipitates. Although inorganic formation is possible, formation of the globules by biogenic processes could explain many of the observed features, including the PAHs. The PAHs, the carbonate globules, and their associated secondary mineral phases and textures could thus be fossil remains of a past Martian biota. (Auth.)

E-55646

Fitzgerald, P.G., Gleadow, A.J.W., **Fission-track geochronology, tectonics and structure of the Transantarctic Mountains in northern Victoria Land, Antarctica,** *Chemical geology,* 1988, Vol.73, p.169-198, 89 refs.

DLC QE515.C43

Apatite ages increase systematically with elevation and together with confined track length distributions, define a two-stage uplift history, although a variety of thermal histories, resolvable by use of confined track length distributions, exist for different parts of North Victoria Land (NVL). A pronounced "break in slope" in the apatite age-elevation profile occurs at ca. 50 Ma, approximating the start of uplift of the mountains. This marks the base of an uplifted apatite annealing zone. Prior to uplift, samples above this break lay within the apatite annealing zone whereas those samples below it had an apatite fission-track age of zero. For most of NVL, ca. 5 km of uplift have been calculated. In the southeastern coastal region, however, uplift of the order of 10 km has been estimated, exposing apatite ages of only 25-35 Ma. Sphene and zircon ages from this area also appear reduced relative to the regional pattern, suggesting that the partial annealing zones for these minerals have been revealed. (Auth. mod.)

E-55647

Campbell, I.B., Claridge, G.G.C., **Landscape evolution in Antarctica,** *Earth-science reviews,* 1988, Vol.25, p.345-353, 13 refs.

The extreme aridity of Antarctica means that very little water is available for weathering and geomorphic processes. The landscape everywhere has been shaped by ice, but land exposed after ice retreat has been modified by cold desert weathering processes. Wind is the main agent for removal and redeposition of weathered material, while fluvial action is insignificant as an eroding or transporting agent. There are few suitable deposits that allow reliable or accurate dating of events but the dates that are available show that landform evolution has been taking place very slowly. Soil weathering studies have provided a useful means of extrapolation showing relative ages of surfaces where no dates are available. The major weathering processes in Antarctica involve patterned ground movement, frost action, wind, salt weathering, and soil weathering. These combine to form distinctive landscape features. The complex nature of landform development is illustrated by considering events that have taken place within Wright Valley, one of the largest ice-free areas in Antarctica. Within this valley are land surfaces ranging from those found on Late Pleistocene up-valley tills, to high altitude extremely fretted and weathered land surfaces that have been ice-free possibly since the Early Miocene. (Auth.)

E-55653

Stroeven, A.P., Prentice, M.L., Kleman, J., **On marine microfossil transport and pathways in Antarctica during the late Neogene: evidence from the Sirius Group at Mount Fleming,** *Geology,* Aug. 1996, 24(8), p.727-730, 26 refs.

There are two extreme views of the evolution of the Pliocene antarctic ice sheet. Dynamicists argue for ice-sheet reduction and reexpansion on the basis of Pliocene marine diatoms in a glacial deposit, the Sirius Group, that is widespread in the Transantarctic Mountains. Stabilists argue from other evidence that the antarctic cryosphere remained essentially constant in area and volume; they propose marine diatom transport by eolian processes and emplacement into terrestrial glacial strata. Hence, the inferred source area and transport mechanism of marine diatoms are of critical importance. The authors tested the reduction hypothesis on an important outcrop of the Sirius Group at Mount Fleming, South Victoria Land. Few unidentifiable marine diatom fragments in Sirius Group strata were observed. In contrast, marine diatoms enclosed in a surface diamicton covering the Sirius Group were more abundant and identifiable. The authors' study further indicates that the Sirius Group at Mount Fleming was not deposited by the East Antarctic Ice Sheet but rather by alpine ice originating on the Transantarctic Mountains. On the basis of both data sets, it is inferred that marine diatoms postdate Sirius Group deposition at Mount Fleming and that transport was by wind. (Auth. mod.)

E-55654

McLoughlin, S., Drinnan, A.N., **Anatomically preserved Permian *Noeggerathiopsis* leaves from east Antarctica,** *Review of palaeobotany and palynology,* May 1996, 92(3-4), p.207-227, Refs. p.224-227.

Permineralized *Noeggerathiopsis* leaves from the Permian Bainmedart Coal Measures of eastern Antarctica are characterized by prominent abaxial stomatiferous furrows protected by dense epidermal hairs. The leaves lack fiber bundles characteristic of Euramerian cordaitaleans. Other leaf morphological characters suggest a possible close relationship between *Noeggerathiopsis* and glossopterids. The striking similarity between the morphology and anatomy of Angaran and Gondwanan cordaites and several other plant groups suggests that not all of these features are convergent, and that some floristic interchange between these opposing high-latitude provinces may have occurred during the late Palaeozoic. The strong stomatal protection in *Noeggerathiopsis* leaves preserved in high-latitude paluda deposits suggests that these structural features are not strictly xeromorphic in function. (Auth. mod.)

E-55655

Moyes, A.B., Groenewald, P.B., **Isotopic constraints on Pan-African metamorphism in Dronning Maud Land, Antarctica,** *Chemical geology,* July 29, 1996, 129(3-4), p.247-256, 27 refs.

Garnet Sm-Nd isotopic data are presented for selected samples from the metamorphic terrane of the U.H. Sverdrupfjella, western Queen Maud Land, and yield Pan-African ages ranging from 680 to 415 Ma. The garnet ages are considerably younger than the inferred initial crystallization age, based on petrographical and fabric analysis, structural and whole-rock and zircon isotopic data. The garnet ages are interpreted as reset ages, but the possibility that the garnets crystallized during the Pan-African event cannot be discounted. In this case, the data imply that the Pan-African orogeny attained lower granulite- to amphibolite-facies metamorphic conditions, as indicated by geothermometry and geobarometry calculations involving garnet. In either case, the Sverdrupfjella area was subjected to significant Pan-African heating to temperatures of the order of 600-650°C. (Auth. mod.)

E-55657

Björck, S., Olsson, S., Ellis-Evans, C., Håkansson, H., Humlum, O., Manuel de Lirio, J., **Late Holocene palaeoclimatic records from lake sediments on James Ross Island, Antarctica,** *Palaeography, palaeoclimatology, palaeoecology,* May 1996, 121(3-4), p.195-220, Refs. p.217-220.

Sediment profiles from several lakes and ponds in the northern ice-free area of James Ross I. were the subject of a multi-disciplinary palaeoenvironmental investigation. The results, obtained from lithological, geomagnetic, geochemical and diatom analyses, were evaluated with multivariate statistics and provide a fairly detailed picture of climate change during the last 5000 years. New radiocarbon dates are combined with previously published ^{14}C dates, so as to date the palaeoenvironmental and palaeohydrological changes identified by the stratigraphic studies. Results are tentatively correlated to other studies of Holocene environments in Antarctica, and from that it can be suggested that the climatic optimum was of circumpolar significance. Therefore the climatic oscillations recorded in sediments on James Ross I. may reflect oscillations in the anticyclonic stormtracks and the strength of the high pressure cell over the inland ice sheet. (Auth. mod.)

E-55660

Humphreys, K.A., Fitzsimons, S.J., **Landform and sediment associations of dry-based glaciers in arid polar environments,** *Zeitschrift für Geomorphologie. Supplementband,* July 1996, Suppl.105, p.21-33, 24 refs.

The principal objective of this study is to examine whether a distinct lithofacies association is produced by small, dry-based glaciers of the Dry Valleys area of southern Victoria Land. Glaciotectonic and sedimentary structures in basal ice, entrained sediment blocks and ice marginal deposits were carefully examined. There is little evidence of the preservation of englacial structures in tills or the highly attenuated tectonic till facies identified by previous workers. The dominant processes involved in the production of ice marginal landforms and sediments in this arid polar environment are entrainment of deformable substrate and the formation of thrust block moraines. The results suggest that the sediment association produced by polar glaciers in an arid environment is distinct from the sediment association produced by temperate glaciers but is similar to that produced by subpolar (polythermal) glaciers. (Auth. mod.)

E-55661

Selkirk, J.M., **Peat slides on subantarctic Macquarie Island,** *Zeitschrift für Geomorphologie,* July 1996, Suppl.105, p.61-72, 40 refs.

Reports of the mass movement of peat in the Southern Hemisphere are few. They occur in environments substantially different from those where peat slides, flows and bog bursts occur in the Northern Hemisphere. This study looks at the characteristics of seven translational peat slides on subantarctic Macquarie I. which have occurred since 1980. They have occurred in herb vegetation on a range of slopes between 5 and 35°. Slides range in area between 375 m^2 and 1200 m^2. The associations among peat slides, seismic activity and intense rainfall events are discussed. Consideration of the long-term stability of vegetated slopes on the islands leads to the conclusion that the failure of these slopes is inevitable. (Auth. mod.)

E-55662

Kojima, H., ed, NIPR Symposium on Antarctic Meteorites, 20th, Tokyo, June 6-8, 1995, **Proceedings of the NIPR Symposium on Antarctic Meteorites, No.9,** Tokyo, National Institute of Polar Research, 1996, 207p., Refs. passim. For selected papers see E-55663 through E-55671.

Sixteen scientific papers, among 88 presented at the symposium, are submitted in this volume of the proceedings, covering such subjects as classification of meteorites, petrology, mineralogy, chemical studies, isotope studies and physical studies on antarctic and non-antarctic meteorites and cosmic dust. Nine of these are pertinent to Antarctica.

E-55663

Funaki, M., Ishikawa, N., **Collection of Yamato meteorites by the 35th Japanese Antarctic Research Expedition,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.1-7, 4 refs.

The 35th Japanese Antarctic Research Expedition found 9 ordinary chondrites and 7 fragments around Camp 1, located 5 km westward from Massif C in the Yamato Mountains. In this area, meteorites have not been collected previously. Meteorite surveys were also carried out along the route of the Camp migrations and around Camp 3, although no meteorites were found. The chondrites examined microscopically may be classified into either H4 or H6 categories. The biggest chondrite (Yamato-9403), which is classified as H6, was examined magnetically. (Auth.)

E-55664

Biriukov, V.V., Ul'ianov, A.A., **Petrology and classification of new antarctic carbonaceous chondrites PCA91082, TIL91722 and WIS91600,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.8-19, 13 refs.

Three antarctic chondrites: Pecora Escarpment (PCA) 91082, Thiel Mountains (TIL) 91722 and Wisconsin Range (WIS) 91600 were studied by SEM-EDS methods and classified as CR2, CV3 and CM2, respectively. PCA91082 and TIL91722 contain rare fine-grained refractory inclusions and amoeboid olivine aggregates without any traces of secondary alteration processes. Chondrule pyroxene is enriched in Cr and Mn compared to pyroxenes from refractory inclusions. Presence of Cr^{2+} and Ti^{3+} with normal Cr^{3+} and Ti^{4+} in chondrule pyroxenes probably indicates reducing conditions during chondrule formation. Several unusual objects, such as a compound P-rich chondrule in PCA91082, and P- and Cr-enriched glasses in WIS91600, were studied. The metal fraction of PCA91082 shows a positive Ni *vs.* Co trend which can be produced by volatilization. (Auth.)

E-55665

Matsuoka, K., Nakamura, T., Nakamuta, Y., Takaoka, N., **Yamato-86789: a heated CM-like carbonaceous chondrite,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.20-36, Refs. p.34-36.

The authors have studied the mineralogy and petrology of the Yamato(Y)-86789 meteorite and concluded that this meteorite is a new member of heated carbonaceous chondrites with CI-CM affinities. It was found that Y-86789 has textural, mineralogical, and compositional characteristics similar to those of Y-86720, which is one of the three unusual antarctic carbonaceous chondrites with CI-CM affinities that show evidence of dehydration. Chondrules are completely replaced by the phyllosilicate-like materials and are surrounded by fine-grained rims. Some chondrules contain Ca-carbonates. There is an abundance of troilite in the matrix, but magnetite and PCP, which are common in CM chondrites, are absent. Some large troilite grains have a euhedral lath-like morphology. The bulk chemical composition of Y-86789 is also similar to that of Y-86720. On the basis of these similarities, it is proposed that Y-86789 and Y-86720 are paired meteorites. (Auth. mod.)

E-55666

Nakamura, T., Nakamuta, Y., **X-ray study of PCP from the Murchison CM carbonaceous chondrite,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.37-50, Refs. p.49-50.

The authors have performed X-ray diffraction measurements and electron-microprobe analyses of PCP particles in the Murchison CM carbonaceous chondrite and determined the relative abundances of minerals in PCP. Type-I PCP, which is rich in Fe and S and occurs as rounded, massive forms, shows high abundance of tochilinite and variable amounts of cronstedtite and magnetite. Tochilinite shows very strong 002 reflection at 5.4 Å and very weak 001 reflection at 10.8 Å, indicating a higher Fe content in octahedral sites. Comparison of the observed X-ray diffraction pattern of type I PCP with the calculated X-ray patterns of tochilinite in various compositions shows that Fe occupies more than 90% of the octahedral sites in tochilinite in PCP, which is quite different from terrestrial tochilinite. Type-II PCP, which occurs mainly in the matrix as fibrous needle clusters, is composed mainly of cronstedtite with a disordered stacking sequence along the c-axis. The other major component of type-II PCP differs between non-clastic and clastic portions. (Auth. mod.)

E-55667

Inoue, M., Nakamura, N., **"Dehydrated" chondrules from the Murchison (CM) chondrite,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.69-78, Refs. p.77-78.

Two "dehydrated" chondrules (MC-5 and MC-27) were obtained from near the fusion crust of the Murchison (CM) meteorite. They have a porphyritic texture with angular or rounded (relict) olivines containing abundant voids, recrystallized olivines, and numerous interstitial Fe oxide grains embedded in groundmass glass. This peculiar texture is similar to that of the fusion crust from the Orgueil (CI) chondrite, indicating that the texture formed during the reheating at the atmospheric entry of the meteorite. Isotope dilution analyses indicate that these chondrules have light-REE depleted patterns with a large negative Eu anomaly. They also show relatively low Ba and Sr concentrations and depletion of alkalies. The lithophile element abundances of the two chondrules are in a similar range with those for other altered CM chondrules in the Murchison and the Yamato-793321 chondrites. It is suggested that the chemical compositions of chondrules, specifically REE and alkali abundances, remained unchanged but significant changes in petrographic texture occurred during atmospheric heating. (Auth.)

E-55668

Shibata, Y., **Opaque minerals in antarctic CO3 carbonaceous chondrites, Yamato-74135, -790992, -791717, -81020, -81025, -82050 and Allan Hills-77307,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.79-96, 19 refs.

Metamorphic sequence and mineralogy of opaque minerals of 7 antarctic CO3 chondrites, Yamato(Y)-74135, Y-790992, Y-791717, Y-81020, Y-81025, Y-82050 and Allan Hills(ALH)-77307, were studied by an optical scanning electron microscope and electron microprobe technique. Based on olivine and chromite compositions, Y-74135, Y-81020 and Y-81025 are classified as least metamorphosed CO3 chondrites. Metamorphic grades of these 3 chondrites are the same as or less than in ALH-77307; metamorphic grades of Y-790992, Y-791717 and Y-82050 are higher than in ALH-77307. The three least metamorphosed chondrites include cohenite abundantly. Judging from the mode of occurrence of cohenite, it would have formed not by the diffusion of carbon into solid Fe-Ni metal but by crystallization from Fe-Ni-C melt. Although previous workers have already pointed out that primitive chondrites often have carbides, this study makes it clear that the existence of cohenite is indeed one of the essential properties in least-metamorphosed CO3 chondrites. (Auth. mod.)

E-55669

Lauretta, D.S., Kremser, D.T., Fegley, B., Jr., **Comparative study of experimental and meteoritic metal-sulfide assemblages,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.97-110, 20 refs.

Sulfide formation via a gas-solid reaction between iron-nickel metal and H_2/H_2S gas mixtures was studied experimentally. This reaction produces distinctive chemical fractionations in both metal and sulfide that can help identify pristine nebular sulfide condensates in meteorites. The resulting sulfide morphology consists of a troilite scale divided into two distinct layers: an inner layer containing small, randomly oriented crystals and an outer layer consisting of large, columnar crystals. A thin band of metal surrounding the unreacted metal core and small metal blebs located in the inner sulfide layer are significantly enriched in nickel relative to the starting metal composition. Microprobe analyses on metal-sulfide assemblages in the LL3 unequilibrated ordinary chondrite Allan Hills-764 (ALH-764) do not show these chemical fractionations. Instead, textural and chemical evidence suggest that these meteoritic sulfides were altered during a post-accretion heating event. (Auth. mod.)

E-55670

Mikouchi, T., Miyamoto, M., McKay, G.A., **Mineralogical study of angrite Asuka-881371: its possible relation to angrite LEW87051,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.174-188, Refs. p.186-188.

Antarctic angrites LEW87051 (LEW) and Asuka-881371 (Asuka) have distinctive textural and mineralogical affinities. LEW is porphyritic in texture with zoned olivines widely distributed in a fine-grained groundmass. Several olivines are known to contain Mg, Cr-rich cores which are out of equilibrium with groundmass olivines and are considered to be xenocrysts. Asuka is ophitic in texture with large olivine xenocrysts included in a groundmass. These olivines reach up to Fo_{89}, and are as rich in Cr and poor in Ca as LEW olivine cores. Despite these similarities, the variability of the olivine compositions differs between the two. Olivine cores of LEW are almost homogeneous in composition from one grain to another, while the large olivines in Asuka show significant grain-to-grain variation. Each large olivine xenocryst in Asuka is nearly homogeneous except for the remarkably zoned edge indicating reaction with the surrounding melt. (Auth. mod.)

E-55671

Sugiura, N., Kiyota, K., Zashu, S., **Nitrogen isotopic compositions of some solar-gas-rich chondrites,** NIPR Symposium on Antarctic Meteorites, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1996, p.189-207, 20 refs.

Isotopically heavy nitrogen was detected in three solar-gas-rich (Weston(H4), ALHA77278(LL3.7) and Yamato-82133(H3)) and one solar-gas-poor (LEW86018(L3.1) antarctic chondrite. Together with a previously studied solar-gas-rich chondrite, all solar-gas-rich chondrites examined have isotopically heavy nitrogen. It is suggested that the solar nitrogen is isotopically heavy. The abundance of the heavy nitrogen is, however, not proportional to that of the solar Ne, suggesting complex processing on the surfaces of the parent bodies. (Auth.)

E-55675

Sutherland, R., **Australia-Pacific boundary and Cenozoic plate motions in the SW Pacific: some constraints from Geosat data,** *Tectonics,* Aug. 1995, 14(4), p.819-831, 39 refs.

Finite poles of Australia-Pacific rotation are calculated using a three-plate (Australia-Antarctica-Pacific) model and published Geosat data analyses of the Indian and Pacific Oceans (GEOS-3P solution). Features identified on maps of Geosat data from SW of New Zealand are used to determine a new best fit finite pole for the prerift (mid Eocene; ca. 45 Ma) configuration of the Australia-Pacific plate boundary and to refine Eocene-Miocene motions on the plate boundary (ca. 45-20 Ma; GEOS-NZ results). Inverting the Australia-Pacific best fit finite rotation to find relative displacements between east and west Antarctica since the Eocene implies dextral oblique extension in the Ross Embayment and almost pure dextral movement in the Queen Maud Range. Early-mid Eocene convergence predicted through Antarctica conflicts with geological evidence and remains an unresolved problem. (Auth.)

E-55679

Fleming, R.F., Barron, J.A., **Evidence of Pliocene *Nothofagus* in Antarctica from Pliocene marine sedimentary deposits (DSDP site 274),** *Marine micropaleontology,* Apr. 1996, 27(1-4), p.227-236, 35 refs.

In this study, the authors report on palynomorph (pollen and spores) and diatom assemblages recovered from DSDP (Deep Sea Drilling Project) Site 274, which is located about 250 km north-northeast of Cape Adare in the Ross Sea. The authors selected Site 274 because of its proximity to the antarctic continent and because it has a more or less continuous record through the Pliocene based on previous chronostratigraphic studies. Dowsett and Poore (1990,91) documented a horizon at about 3 Ma when climate in the North Atlantic was warmer than today and inferred that this represented a global warming event. Because this possibly was a time when *Nothofagus* was present in Antarctica during a warm interval, the authors focused their attention on sediments of this age from Site 274. Biostratigraphic analysis of diatoms provides reliable age control for Pliocene sediments from Site 274 and allows examination of samples that are unequivocally mid-Pliocene in age. This offers the possibility that fossil pollen of *Nothofagus* recovered from Site 274 can provide insight into the debate about vegetation in Antarctica during the Pliocene. (Auth. mod.)

E-55680

Warnke, D.A., Marzo, B., Hodell, D.A., **Major deglaciation of east Antarctica during the early Late Pliocene? Not likely from a marine perspective,** *Marine micropaleontology,* Apr. 1996, 27(1-4), p.237-251, 63 refs.

The authors conducted an integrated study of ice-rafted debris (IRD) and oxygen isotopes using samples from the early Late Pliocene Gauss Chron from ODP Site 114-704 on the Meteor Rise in the subantarctic South Atlantic. During the early Gauss Chron, the oxygen isotopic ratios are generally less than their respective Holocene values. The lowest values in this record can accommodate a warming of about 2.5°C or a sea-level rise of about 50 m, but not both, and probably result from some warming and a small reduction in global ice volume. In order to reach the site, this material must have been transported by large, tabular icebergs derived from antarctic ice shelves or ice tongues, similar to occasional large modern icebergs. This combined record suggests strongly that the antarctic ice sheet was essentially intact; some warming at the drill site is indicated, but not a major reduction in ice-volume on Antarctica. (Auth. mod.)

E-55681

Marchant, D.R., Denton, G.H., **Miocene and Pliocene paleocli-**

mate of the Dry Valleys region, Southern Victoria Land: a geomorphological approach, *Marine micropaleontology,* Apr. 1996, 27(1-4), p.253-271, Refs. p.269-271.

This paper presents geomorphic data from the Dry Valleys region of southern Victoria Land that indicate persistent cold-desert conditions and imply an enduring East Antarctic Ice Sheet since middle Miocene time. The authors acknowledge that some warming probably occurred in the Dry Valleys region during Pliocene time, but this warming was likely less than 3°C to 8°C and was insufficient to cause significant geomorphic change/landscape evolution of the Dry Valleys region. This paleoclimate record does not incorporate the effects of potential surface uplift in the Dry Valleys region. (Auth. mod.)

E-55682

Webb, P.N., Harwood, D.M., Mabin, M.G.C., McKelvey, B.C., **Marine and terrestrial Sirius Group succession, middle Beardmore Glacier-Queen Alexandra Range, Transantarctic Mountains, Antarctica,** *Marine micropaleontology,* Apr. 1996, 27(1-4), p.273-297, 48 refs.

In this paper the authors develop the argument that the Beardmore valley was earlier occupied by a major arm of the Ross Sea, having significant implications regarding the late Cenozoic ice sheet and uplift histories for the Beardmore Glacier-Queen Alexandra Range of Antarctica. (Auth. mod.)

E-55691

Thomas, R.J., Jacobs, J., **Geological mapping of the $\approx$1.1 Ga Cape Meredith complex (west Falkland),** *Journal of African earth sciences,* Feb. 1996, 22(2), p.IV-V, 6 refs.

This brief essay provides an additional viewpoint towards resolving the puzzle of how to fit the Falkland Islands Cape Meredith complex into the Natal-Queen Maud Land Proterozoic basement geology.

E-55692

Alberti, A., Vezzalini, G., Galli, E., Quartieri, S., **Crystal structure of gottardiite, a new natural zeolite,** *European journal of mineralogy,* Jan./Feb. 1996, 8(1), p.69-75, 12 refs.

The paper provides further explication of the rare mineral, gottardiite, newly found in Antarctica. Its structure, composition and symmetry are described and its topology is compared to that of the synthetic xeolite, NU-87. For the account of the antarctic finding, see 23E-53689.

E-55717

Tang, Y.Q., Yang, Z.X., Xu, L.Q., Zhou, J., **Alkane and aromatic hydrocarbons in sediments in the sea area near the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.81-87, In Chinese with English summary. 8 refs.

DLC G845.5.C45 1989 Orien China

In waters adjacent to the Antarctic Peninsula and in the Bransfield Strait, the concentration of lipid compounds in sediments ranged from 270 to 1767 ppm. The highest concentrations were found in Bransfield Strait: 1293 and 1767 ppm. The pristane to phytane ratio was used to determine the oxidation or reduction of the sedimentary environment. The distribution of N-alkane carbon numbers suggests that the organic matter originated from marine organisms and terrestrial plant detritus. Different levels of polycyclic aromatic hydrocarbon were detected in 7 of the 19 stations investigated. Chrysene ranged from 5 to 61 ppb in dry sediments. (Auth. mod.)

E-55718

Cheng, X.H., Wang, C.H., **Oxidants of organic decomposition and their environment information in the Maxwell Bay, Antarctica during summer,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.88-93, In Chinese with English summary. 13 refs.

DLC G845.5.C45 1989 Orien China

Some chemical compounds act as main oxidation agents in the decomposition of organic matter in marine sediments; they also indicate different geochemical environments. Results of chemical analysis of sediments in Maxwell Bay show that below the interface of overlying water and sediments (0-2 cm) manganese dioxide acts as the main oxidation agent in the decomposition of organic matter. From 2 to 10 cm, the main oxidation agent is ferric oxide which further down is replaced by SO_4^{2-}. It is suggested that from 0 to 10 cm the sediments show decreasing oxidation conditions. (Auth. mod.)

E-55719

Gong, M., Lu, B., Tang, Y.Q., **Study of amino acids composition in sediments from western sea area of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.94-100, In Chinese with English summary. 3 refs.

DLC G845.5.C45 1989 Orien China

The distribution of amino acids in marine sediments and humic substances (humic and fulvic acids) off the Antarctic Peninsula is discussed. The order of their abundances is: neutral amino acids > acidic amino acids > basic amino acids > aromatic amino acids. It is suggested that this reflects the characteristic changes of organism, sedimentary environment and climatic conditions during sediment formation. The total amount of amino acids in humic substances indicates that the fulvic acid level is higher than that of the humic acid, their components showing an apparent regularity. The contents of glycine, alanine, aspartic and glutamic acids are the highest, indicating that the humic substances are derived from terrestrial vegetation. Sulfur-bearing amino acids (methionine and cysteine) were found in very small amounts; their contents and diagenesis are discussed. (Auth. mod.)

E-55720

Jiang, S.C., Tang, Y.Q., Gong, M., **Preliminary study on sterols in sediment in the sea area near Livingston Island,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.101-103, In Chinese with English summary. 3 refs.

DLC G845.5.C45 1989 Orien China

A study on the distribution of sterols in marine sediments in the area adjacent to Livingston I. is reported. The sterol fractions were converted to trimethylsilyether (TMS-ether) and examined using GC-MS-DS. There were 12 kinds of stanels in the sediments: 24-norcholesta-5, 22-dien-3β-ol, 24-nor-5α-cholest-22-en-3β-ol, 27-nor-24-Methylcholesta-5, 22-dien-3β-ol, Cholest-5, 22-dien-3β-ol, 5α-Cholest-22-en-3β-ol, cholest-5-en-3β-ol, 24-Methycholest-5, 22-dien-3β-ol, 24-Methyl-5α-cholest-22-en-3β-ol, 24-Methylcholest-5α-en-3β-ol, 23,24-Dimethylcholesta-5, 22-dien-3β-ol, 23, 24-Dimethyl-5α-cholest-22-en-3β-ol, 24-ethyl-cholest-7-en-3β-ol. It is suggested that they derived from plankton and diatoms, but that the 24-ethylcholest-7-en-3β-ol was provided by high plant detritus. (Auth. mod.)

E-55721

Tang, Y.Q., Wang, Y.F., Jiang, S.C., **Distribution of carboxylic acids and fatty alcohols in sediments in the sea area around the South Shetland Islands,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.104-112, In Chinese with English summary. 14 refs.

DLC G845.5.C45 1989 Orien China

In sediment studies around the South Shetland Is., the long-chain monocarboxylic acids were distributed in a series of saturated $C_{14:0}$ to $C_{30:0}$ and branched chains were iso $C_{17:0}$, the unsaturated were $C_{16:1}$ Δ9,

$C_{18:1}$ Δ9, $C_{18:1}$Δ11 and diunsaturated was $C_{18:2}$Δ9, 12. The dominant carboxylic acid was straight chained $C_{16:0}$ (palmitic acid) with a strong even-odd predominance. The characteristic of distribution indicates that the source is derived from marine organisms mainly, mixed with minor terrestrial detritus. Aliphatic alcohols were distributed in a series of carbon numbers from C_{16} to C_{32}. Maximum peak of carbon numbers differ in C_{16}, C_{18}, C_{20}, C_{28} and C_{30}. According to the ratio of $C_{16:0}$-$C_{22:0}$ to $C_{24:0}$-$C_{32:0}$ the aliphatic alcohols were classified into four types from 19 samples. (Auth. mod.)

E-55746

Chen, W.B., **Radiolaria biostratigraphy of core S_{11} in the area northwest of Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.313-321, In Chinese with English summary. 11 refs.

DLC G845.5.C45 1989 Orien China

Samples of a core 3.41 m long collected from the upper continental rise northwest of the Antarctic Peninsula were used in the study of radiolarian biostratigraphy. Radiolarians were found in all 61 samples and 140 species were identified. According to the relative abundance fluctuation of the species of the *Cyclodophora davisiana* (Ehr.), the oldest sediments of the core are assigned to 30,000 B.P., with the age at the interval of 240 cm of 18,000 B.P. (18K). The boundary between the Holocene and the Late Pleistocene is at 140 cm with an age of 14,000 B.P. Based on the ratio of the antarctic *Spongotrochus glacialis* and *Lithelius nautiloides* to the subantarctic *Lithamphora furcaspiculata* and *Theocalyptra bicornis,* the surface water temperature during the Holocene is estimated at about 5°C, and the surface water temperature during the Late Pleistocene is estimated near 0°C. (Auth.)

E-55747

Zhan, Y.F., **Diatom distribution of core S_{11} and paleoclimate variation in the northwestern sea area of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.322-328, In Chinese with English summary. 5 refs.

DLC G845.5.C45 1989 Orien China

For the study of diatoms, 32 samples of a core collected off the Antarctic Peninsula were analyzed and 57 species were identified. Based on the variation of diatom abundance and species dominance, they are divided into 5 assemblages: *Nitzschia kerguelensis-Cosinodiscus lentiginosus* (0-10 cm); *N. kerguelensis-Cos. lentiginosus-Eucampia balaustium* (10-80 cm); *Cos. lentiginosus-E. balaustium* (80-125 cm); *Cos. lentiginosus-E. balaustium-Charcotia actinochilus* (125-250 cm); and *Charcotia actinochilus-Cos. lentiginosus* (250-341 cm). Paleoclimatic variations are discussed. Results of the temperature curve of warm species to cold species *(kerguelensis/actinochilus),* compared with the curve of oxgyen isotopes, calcium carbonate and Radiolaria, show that the later sedimentation stage (0-125 cm) corresponds to a warm stage. The earlier sedimentation stage (125-341 cm) corresponds to a cold stage; and the turning point (240 cm) corresponds to the last glacial maximum. (Auth.)

E-55748

Zhou, F.G., Feng, C.Y., Lu, W., Wu, L.H., Zhang, Z.X., **Clay deposited in ice-water from the sea area around the South Shetland Islands,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.329-339, In Chinese with English summary. 8 refs.

DLC G845.5.C45 1989 Orien China

Data on marine sediments, obtained during investigations carried out around the South Shetland Is. in 1985, show that the sediments consist of sand, silt with fine gravel, gravel and clay. Five clay-mineral assemblages show that montmorillonite, altered from basic volcanic rock and having good crystal form, occupies the first place; altered chlorite from basic rock and altered illite, as well as kaolinite from the intermediate-acid rock, come second. It is suggested that the deposition processes in this area are contolled by terrigeneous supply, ice rafting and ice-water environment. (Auth. mod.)

E-55749

Wang, X.L., **Sedimentary model and dynamic process of the Great Wall Bay coast, Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.340-345, In Chinese with English summary. 6 refs.

DLC G845.5.C45 1989 Orien China

The coastal sediments of the Great Wall Bay change rapidly with changing topography and environmental dynamics. They are identified as 6 facies-belts, from high-water level to the subtidal zone: the backshore-silt belt; the shore-gravel bar, or storm-ridge belt; the foreshore gravel-sand belt; the foreshore sand-gravel bank belt; the offshore sand belt; and the offshore silt belt. These facies-belts occur mostly on the southeast coast of King George I. Several ancient gravel bars, or storm ridges developed along the coast about 200-500 B. P., are suggested as evidence of a recent rising of the coast.

E-55750

Xu, B.T., Shi, G.C., Gao, S.T., Qiao, G.S., **Stable isotopic compositions and REE distributions of sea-floor sediments in high latitudes of the southern ocean,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.346-354, In Chinese with English summary. 10 refs.

DLC G845.5.C45 1989 Orien China

In order to obtain geochemical information on marine sediments and their separated quartzes and clay fractions, samples were collected around the South Shetland Is. and northwest of Adelaide I. The samples were analyzed for hydrogen, oxygen and strontium isotopic composition and REE (rare earth elements) distribution. The $\delta^{18}O$ value of these sediments is much lower than that in sediments from middle and low latitudes. It is suggested that these sediments originated from the terrigenous clastic materials in the high latitude igneous region. The terrigenous clay mineral characteristics show clay fractions with montmorillonite amounts, which could be marine authigenic minerals deriving from the sea-floor igneous materials through sea-water alterations. A low $^{87}Sr/^{86}Sr$ ratio of the sediments, and their REE distribution pattern, indicate that they derived from Mesozoic-Cenozoic volcanic rocks on the Antarctic Peninsula.

E-55751

Feng, Y.J., Lin, D.Q., **Clastic sediment features in the sea area adjacent to the South Shetland Islands,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.355-365, In Chinese with English summary. 2 refs.

DLC G845.5.C45 1989 Orien China

Thirty-one surface samples of marine sediments were collected around the South Shetland Is. at depths from 20-110 m. Grain size and surface features of 29 samples were determined; a sediment classification, based on topography, location and field sampling records is presented. The sediment distribution in the investigated area is found to be similar to that in the middle and low latitudes; however, glacial transportation and ice rafting features are present in these sediments. They are believed to have originated mainly from the Antarctic Peninsula.

E-55752

Huang, H.Y., Wang, H.Z., Wu, B.Y., Wu, Z.N., Zhang, Z.X., Ge, J.P., **Characteristics of marine glacial deposition surrounding the South Shetland Islands, Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.366-377, In Chinese with English summary. 8 refs.

DLC G845.5.C45 1989 Orien China

Based on analysis of grain size of marine sediments and surface texture of quartz sands at the South Shetlands, their glacial and marine origin is established. To confirm this, evidence indicating glacial occurrence is described in detail, including sediment composition and surface features showing glacial striae, fissures and denuded chips caused by freezing action. Histogram curves of grain size distribution show bimodal or multimodal shapes. Evidence suggesting that the sediments have been reworked significantly by marine agents, due to active oceanic currents, is also discussed. According to geographic position, sea floor topography and the pattern and intensity of marine agents, the study area is subdivided into 3 environments showing differences in sediment properties.

E-55753

Lin, C.Q., Zheng, L.F., **Sediment types and sedimentation of the northwestern sea area of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.378-386, In Chinese with English summary. 3 refs.

DLC G845.5.C45 1989 Orien China

The classification system of glacial-marine sediment types of Harland et al (1966) and Anderson et al (1977) indicates that there are two types of sediments in the northwestern sea area of the Antarctic Peninsula: residual and compound paratills. ^{14}C dating of surface sediment samples shows that the sediments are recent. Their compositions of detrital minerals and clay coincide with the lithology of land near the study area, indicating that most sediments derive from the weathering of rocks on the west coast of the Antarctic Peninsula and the South Shetland Is. The sediment sources are mainly glacier and volcanic inputs and organisms. It is concluded that, although the sediment model is relatively simple, the factors controlling their distribution, including glaciers, current effects, volcanic extrusion and carbonate compensation depth, are very complex. (Auth. mod.)

E-55754

Zhu, F.G., **Clay minerals and its environment significance in the land-samples from the Fildes Peninsula of Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.387-395, In Chinese with English summary. 3 refs.

DLC G845.5.C45 1989 Orien China

Analysis of clay minerals in 20 samples from Fildes Peninsula show that they consist mainly of montmorillonite, interstratified montmorillonite-illite, interstratified montmorillonite-chlorite, chlorite, kaolinite and halloysite. The distribution of clay minerals and their chemical characteristics are described. It is pointed out that clay mineral assemblages and sample composition show evidence of pronounced weathering, which is found to be helpful in the study of antarctic paleoclimatology and paleoceanography.

E-55755

Lu, W.Z., Wu, S.G., **Characteristics of geomagnetic field and tectonic evolution of the southeast Pacific,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.396-408, In Chinese with English summary. 10 refs.

DLC G845.5.C45 1989 Orien China

The geomagnetic field of the southeast Pacific Ocean and Drake Passage is divided into 3 sets of magnetic anomalies: those of the Pacific-Antarctic Ridge; Chile Ridge and Patagonia; and Bellingshausen Sea and Drake Passage. Identification of these anomalies indicates that there is no oceanic crust older than the Cretaceous in the southeast Pacific. During the Late Cretaceous, New Zealand separated from Antarctica and generated the Pacific-Antarctic Ridge. From the Paleocene to Early Eocene, Aluck Ridge formed in the Bellingshausen Sea; Chile and Aluck ridges were inactive from the Eocene to Late Paleocene. The geologic times and geographic locations in which the fragmentation of Gondwanaland evolved are given.

E-55756

Li, C.Z., **Paleomagnetic results of sedimentary core S_{11} from northwestern sea area of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.409-412, In Chinese with English summary. 2 refs.

DLC G845.5.C45 1989 Orien China

Paleomagnetic measurements were carried out in 112 sections of a 3.41 m-long core from the northwestern deep basin of the South Shetland Is. Results of measurements show that the natural remanent magnetic inclination is all negative; that it ranges from -30° to -88°; and that the natural remanent magnetization is from 0.1×10^{-3} to 0.52×10^{-3} emu. It is concluded that the ^{14}C dating values of surface and subsurface sediments in surveyed areas, together with sedimentologic and micropaleontologic data, suggest a Brunhes polarity epoch age for the core.

E-55758

Wang, C.H., Zhang, Z.X., **Continental margin of the northwest part of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.417-423, In Chinese with English summary. 2 refs.

DLC G845.5.C45 1989 Orien China

The northern and western margins of the Antarctic Peninsula are described as having two different geomorphologic formats. It is suggested that the two types of continental margins had different geologic backgrounds and have undergone different developmental processes; that their forming mechanism was different, as are the geomorphic types distributed in the two areas of the Peninsula; and that there are more submarine canyons on the continental shelf and slope of the northern margin than there are on the western margin. It is concluded that glaciation played an important role in the geomorphic development of the region, resulting in increased shelf depth, development of submarine canyons, and in the formation of underwater bars and fans on the outer shelf and at the foot of the slope.

E-55762

Peccerillo, A., Tripodo, A., Villari, L., Gurrieri, S., Zimbalatti, E., **Genesis and evolution of volcanism in back-arc areas. A case history, the Island of Deception (Western Antarctica),** *Periodico di mineralogia,* 1991, 60(1-3), p.29-44, With Italian summary. Refs. p.43-44.

DLC QE351.P4 1991

Major and trace element data reported on a suite of representative lava samples indicate that the Deception I. rocks make up a continuous Na-transitional series ranging from basalt to trachyte. Sr isotopic ratios determined on three samples with different degrees of evolution show only slightly variable values (0.70340-0.70356), thus supporting closed-system evolutionary processes. The Deception I. volcanics, including the most mafic ones, have some geochemical characteristics such as negative anomalies of HFSE and positive spikes of Sr, which indicate an island-arc affinity for these rocks. Quantitative modelling suggests that it is unlikely that these characteristics were all acquired during the shallow level evolution of the magmas and indicate that they are partially inherited from the source. This strongly indicates that an island-arc component affected the source of the Deception I. magma, possibly by introduction within the mantle wedge of fluids or melts released from the oceanic slab which was subducting under the South Shetlands during Tertiary times. (Auth. mod.)

E-55783

Li, Z.N., **Self-organization phenomena of the nonequilibrium process in magmatism of the Fildes Peninsula, West Antarctica,** *Antarctic research,* June 1996, 7(1), p.1-18, 11 refs.

Volcanic, geological, petrological and geochemical characteristics of the Tertiary volcanic rocks from the Fildes Peninsula show that magma evolution was a process of dissipation of heat energy, exchanged energy and mass, occurring between the magma system and its surrounding environments, and with the feature of dynamic equilibrium and periodicity (stage). In this study, volcanic rocks of different types commonly exhibit a multi-grade composite texture; the derivative magmas, produced by differentiation of parent magmas in the magma chamber, show a zonal structure in the high-level-magma chamber which represent the self-organization phenomenon of the nonequilibrium process in magmatism. The self-organization phenomenon is a dissipative structure formed under certain conditions. (Auth.)

E-55784

Wang, D.D., Chen, Y.H., **Chemical compositions of antarctic iron meteorites and their classification,** *Antarctic research,* June 1996, 7(1), p.41-49, 19 refs.

The concentrations of 13 elements in the metal of 52 antarctic irons have been reported; these irons have been classified based on the structures and their Ga, Ge, Ni, Ir and other trace elemental contents. The 52 iron meteorites assigned to chemical groups consist of 16 of IAB, 12 of IIAB, 1 of IIE, 3 of IIIAB, 1 of IIICD, 1 of IVA and 18 of ungrouped irons. The IAB, IIICD and IIE iron meteorite groups are considered to be of nonmagmatic origin. Nonmagmatic IAB, IIICD and IIE irons formed as individual pools of a chondritic body. The other groups, IIAB, IIIAB and IVA show evidence of having originated by fractional crystallization of a metallic magma. The slopes on element-Ni trends in the magmatic are generally higher than in the nonmagmatic groups. Most interesting are the high abundance of ungrouped and IAB (47.2% and 27.8%, respectively) and low abundance of IIIAB (5.8%). Antarctic irons of the group abundances can be distinguished from non-antarctic irons, which provide information about previously unsampled parent planets, mass, shock and collision, as well as nebula regions. (Auth.)

E-55785

Tang, Y.Q., Jiang, J.Z., Lu, B., Sui, L.R., **C_5-C_{15} hydrocarbons in surface sediments from the Bransfield Strait, Antarctica,** *Antarctic research,* June 1996, 7(1), p.57-69, 18 refs.

Multivariate statistical analysis, made on sediment samples from the Bransfield Strait to determine the C_5-C_{15} hydrocarbon composition, shows that they contain n-alkanes, iso-alkanes, cyclo-alkanes, and aromatic compounds and their substituted compounds. The multivariate statistical analysis also reveals that stations G-25 and G-27 show the highest levels after rotation. (Auth. mod.)

E-55786

Zhao, Y., Li, T.J., **Pedogenic groups and diagnostic characteristics in the Fildes Peninsula of King George Island, Antarctica,** *Antarctic research,* June 1996, 7(1), p.70-78, 9 refs.

Based on the analysis of soil-forming factors, pedogenic processes and soil properties in the study area, the soil geographic and genetic classification of maritime-climatic subantarctic regions is proposed. Soils of the Fildes Peninsula were classified into 3 soil orders, 4 suborders and 13 soil groups. The relationship between the soil distribution and the environment is discussed. (Auth.)

E-55791

Mahaney, W.C., Claridge, G., Campbell, I., **Microtextures on quartz grains in tills from Antarctica,** *Palaeogeography, palaeoclimatology, palaeoecology,* Apr. 1996, 121(1-2), p.89-103, 34 refs.

Quartz grains of the sand fractions from tills of Oligocene to Quaternary age in Antarctica were analyzed by scanning electron microscope to test the hypothesis that relative ice thickness and distance of transport influence the type and range of microtextures observed on individual grains. In this study, replicated subsamples were analyzed from tills emplaced by thick glaciers with both short and long transport distances. Till samples with grains transported over long distances under thick ice were compared with quartz grains from relatively thinner outlet glaciers with shorter transport distances. A range of microtextures was used to determine the environmental history of these grains. (Auth. mod.)

E-55816

Birkenmajer, K., **Geology of Cretaceous magmatic rocks at Paradise Harbour, Danco Coast, Antarctic Peninsula,** *Studia geologica Polonica,* 1994, Vol.104, p.7-40, With Polish summary. Refs. p.38-39.

The area of Paradise Harbor is part of the Mesozoic magmatic arc of the Antarctic Peninsula. It consists of Early Cretaceous basaltic lava-agglomerate pile (Antarctic Peninsula Volcanic Group, APVG) some 2000 m thick, with subordinate rhyodacite lava intercalations, formed in a marginal marine basin setting, post-dated by Cretaceous Andean plutons (Andean Intrusive Suite, AIS-1: granite, granodiorite, diorite, gabbro), and Cretaceous acidic, intermediate and basic hypabyssal dykes (AIS-2). The APVG effusives rest unconformably upon sedimentary basement formed by strongly folded Trinity Peninsula Group (TPG: Paradise Harbour Formation, Permo-Triassic?). The APVG, together with its TPG basement and, possibly, also a part of Andean plutons (AIS-1) and younger dykes (AIS-2) are involved in SE-vergent, retro-arc thrusts. The thrust-folding could be an expression of the oceanic Aluk Ridge/Antarctic Peninsula Magmatic Arc collision in a sector between the Tula and Anvers Fracture Zones during the Tertiary. (Auth.)

E-55817

Doktor, M., Swierczewska, A., Tokarski, A.K., **Lithostratigraphy and tectonics of the Miers Bluff Formation at Hurd Peninsula, Livingston Island (West Antarctica),** *Studia geologica Polonica,* 1994, Vol.104, p.41-104, With Polish summary. Refs. p.101-103.

The Miers Bluff Formation (MBF) is over 1600 m thick. It is subdivided into 3 mappable members: the South Bay Member (SBM), more than 850 m thick; the Johnsons Dock Member (JDM), about 150 m thick; and the Glacier Rocoso Member (GRM), about 600 m thick. The MBF is a marine, clastic, turbidite succession corresponding to the proximal (SBM and GRM) and distal (JDM) parts of a submarine fan. Six facies associations were distinguished in the MBF. These facies associations occur in different proportions in particular members. The whole succession is devoid of body megafossils and microfossils, although marine trace fossils have been found in every member. The petrologic differentiation of the MBF is insignificant. Its source area consisted largely of metamorphic and volcanic rocks, however no traces of contemporaneous extrabasinal volcanism have been found. The source area was possibly a dissected continental margin. (Auth. mod.)

E-55838

Shergold, J.H., Cooper, R.A., **Late Cambrian trilobites from the Marine Group, northern Victoria Land, Antarctica,** *BMR journal of Australian geology & geophysics,* June 1984, 9(2), p.91-106, Refs. p.104-106.

This paper describes the youngest Late Cambrian trilobite assemblage so far discovered in the Mariner Group (Bowers Supergroup) in northern Victoria Land. It occurs near the base of the Limestone Unit in the middle of the Eureka Formation, at Eureka Spurs, at the head of Mariner Glacier. The assemblage contains seven determined trilobite taxa. This fauna is related to material previously described from Kazakhstan or southern Siberia, north China, Australia and North America. Russian relationships appear to be dominant, but palaeogeographically difficult to explain. The present fauna is younger than that earlier described from the underlying Spurs Formation, which was considered to be late Idamean (late Dresbachian). The Eureka material is likely to be immediately post-Idamean (early Franconian), but its exact biochronological position is not yet finally established. (Auth. mod.)

E-55857

Motoyoshi, Y., Shiraishi, K., Asami, M., **Explanatory text of geological map of the northern Yamato Mountains, Antarctica. (2) Mt.Torimai,** Japanese Antarctic Research Expedition. Antarctic Geological Map Series. Sheet 27, Tokyo, National Institute of Polar Research, 1995, 8p. + 6 plates, 24 refs.

The text accompanies a map scaled at 1:25,000 of the Yamato Group (Queen Fabiola Mountains), featuring Mt. Torimai. The map is approximately 30" x 42" in size and is color-coded to show areas of moraine and various mineral deposits, rock forms, and geochemical features. The text provides a brief review of prior JARE explorations, describes the general geology of the region, and identifies various structural and the lithological components which predominate.

E-55874

Zheng, X.S., Birkenmajer, K., **Petrochemistry and geochemistry of Tertiary volcanics, northern coast of King George Island, West Antarctica,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.1-15, In Chinese with English summary. Refs. p.13-15.

Tertiary volcanic rocks located in the Fildes Block and outcropped along the northern coast of King George I. include basalt, basaltic andesite, andesite and dacite effusives (Fildes Peninsula Group, FPG), basaltic and andesitic plugs (Admiralty Bay Group, ABG), and intrusive rocks of Wegger Peak Group (WPG) collected from Barton Horst near North Foreland. Most of basic lavas are porphyritic with plagioclase and augite phenocrysts. Rare orthopyroxene is found in andesite. The component of plugs is very similar to effusives, although it contains less phenocrysts. Results of the major and trace element contents of volcanic rocks, measured with XRF and INAA in China, are given. It is concluded that the volcanic rocks of FPG lavas and ABG plugs, as well as WPG granodiorites, show calc-alkaline characteristics, being part of the South Shetland magmatic arc. They might have been generated directly by partial melting of upper mantle, being associated with the same simple magma source that resulted from the Mesozoic to Cenozoic volcanic activities controlled by the subduction of proto-Pacific oceanic crust beneath the Antarctic Plate. (Auth. mod.)

E-55877

Wang, Y.X., Qian, Z.X., Zheng, H.H., **REE geochemistry of lacustrine deposit on the Fildes Peninsula,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.35-41, In Chinese with English summary. 8 refs.

Study of REE geochemical patterns of lacustrine deposits on Fildes Peninsula shows that they are very similar to those of Tertiary volcanic rocks on the Peninsula, suggesting that the deposits are derived from island-arc volcanic rocks. The difference of REE compositions between lacustrine face deposits and drift sheets shows that they underwent chemical weathering of different degree, with different clay content. The Ce anomaly suggests that the cycle of lacustrine deposits evolved from a wet environment into a drier one. The REE contents and compositions are unvaried, indicating that the climate was relatively dry in Middle and Late Holocene. (Auth. mod.)

E-55883

Péwé, T.L., **Multiple glaciation in the McMurdo Sound region, Antarctica: a progress report,** *Journal of geology,* Sep. 1960, 68(5), p.498-514, 19 refs.

At least four major Quaternary glaciations, each successively less extensive than the former, are recorded in the McMurdo Sound region. Deposits of the earliest recognized glacial advance occur high on ridges and flat areas. The deposits are 2,000 feet above the valley floor, are badly weathered, and have little or no morainal form. Ice of this glaciation filled all the valleys and must have filled McMurdo Sound to an elevation of 2,000 feet. Deposits of the next two succeeding glaciations are distributed around the sound as well-preserved, but considerably subdued, moraines of both outlet and alpine glaciers. During the earlier of these two glaciations, alpine glaciers reached the expanded Koettlitz and Ferrar outlet glaciers. Outlet glaciers filled the southern part of McMurdo Sound to an elevation of about 1,000 feet. During the latter of these two advances many alpine glaciers did not reach the outlet glaciers. (Auth.)

E-55884

Takahashi, K., **Remnant of water-rock interaction on the lunar surface,** *RIKEN review,* Aug. 1995, No.10, p.37-38, 10 refs.

Lunar meteorites recovered in Antarctica are recognized to have been derived from the lunar highlands and these meteorites show several characteristic features in their chemical (major element compositions and trace element abundance, rare earth elements) and isotopic systems (^{87}Rb-^{87}Sr systematics). These features imply the existence of H_2O (maybe as ice) on the surface of the ancient (before 4.0 bya) moon. This study examines such meteorite samples. (Auth. mod.)

E-55902

Galli, E., Quartieri, S., Vezzalini, G., Alberti, A., **Gottardiite, a new high-silica zeolite from Antarctica: the natural counterpart of synthetic NU-87,** *European journal of mineralogy,* July/Aug. 1996, 8(4), p.687-693, 17 refs.

Gottardiite has been discovered in the Jurassic Ferrar dolerites of Mt. Adamson, northern Victoria Land. The new zeolite occurs as subparallel aggregates of transparent pseudo-hexagonal lamellae. The mineral is orthorhombic, space group *Cmca*. The strongest X-ray diffraction lines are identified. Gottardiite is optically biaxial and its framework topology is the same as that of synthetic NU-87. Its chemical formula, Si/Al ratio, and density numbers are provided. Thermal stability and rehydration capacity are both very high. The name is in honor of Glauco Gottardi (1928-1988).

E-55905

Wrona, R., Zhuravlev, A.IU., **Early Cambrian archaeocyaths from glacial erratics of King George Island (South Shetland Islands), Antarctica,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.9-36, Refs. p.32-36.

Twenty-six species of archaeocyaths are described (7 in open nomenclature), including *Naimarkcyathus elenae* gen. et sp. n. representing a new family Maimarkcyathidae and superfamily Maimarkcyathoidea of the order Archaeocyathida, from the Cambrian limestone erratics in the glacio-marine sediments of the Oligocene Polonez Cove and Early Miocene Cape Melville Formations on King George I. They are accompanied by coralomorphs and calcified cyanobacteria. The archaeocyathan assemblage closely resembles allochthonous assemblages from the Weddell Sea and Whichaway Nunataks. Current reconstructions of ice stream movement and iceberg drift, and similarities in species composition, suggest the Argentina Range limestones as a source of these erratics. The species *Stapicyathus stapipora, Prethmophyllum subacutum, Aporosocyathus mucroporus, "Mennericyathus" dissitus, Paranacyathus sarmaticus* and *Archaeopharetra irregularis* are added to the list of common species for Antarctica and Australia. The total list of the common Australian-Antarctic archaeocyaths now includes 31 of all of the 52 well defined antarctic species. (Auth. mod.)

E-55906

Holmer, L.E., Popov, L.E., Wrona, R., **Early Cambrian lingulate brachiopods from glacial erratics of King George Island (South Shetland Islands), Antarctica,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.37-50, Refs. p.48-50.

Erratic boulders of Early Cambrian age, occurring within the Early Miocene Glacio-marine Cape Melville Formation on King George I., have yielded lingulate brachiopods including *Eoobolus* aff. *elatus* (Pelman, 1986), *Karathele napuru* (Kruse, 1990) and *Vandalotreta djagoran* (Kruse, 1990). It is the first Early Cambrian brachiopod assemblage described from Antarctica. The fauna is closely similar to that from the late Early Cambrian (Toyonian) Wirrealpa and Aroona Creek Limestones, Flinders Ranges, South Australia. The new family Eoobolidae is proposed and the type species of *Eoobolus, E. Triparilis* (Matthew, 1902) is re-figured. The evolution of the botsfordiids and acrothelids is discussed in the light of the new material of *K. napuru,* which is intermediate in morphology between *Botsfordia* and *Eothele.* The superfamily

Acrotheloidea is referred to the order Lingulida because of the similarities in muscle system, shell structure and development of pseudointerareas. (Auth.)

E-55907

Stolarski, J., **Paleogene corals from Seymour Island, Antarctic Peninsula,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.51-63, Refs. p.62-63.

From the Sobral Formation (Paleocene) of Seymour I. solitary coralla of *?Aulocyathus* Marenzeller, 1904 (suborder Caryophylliina) and branch fragments of *Madrepora sobral* Filkorn, 1994 (suborder Faviina) are described. In the overlying strata of the La Meseta Formation (Eocene) scleractinian coral fauna comprises solitary Caryophylliina *(Crispatotrochus antarcticus* sp. n., *Caryophyllia* sp., *Flabellum* sp.) and colonial Dendrophylliina *(Tubastraea* sp.). Octocoral holdfasts are also reported. The genera recorded from both formations are known also from modern seas. *C. antarcticus* sp. n. is the earliest representative of the genus. *?Aulocyathus* and *Tubastraea* have no other known fossil record. (Auth.)

E-55908

Bitner, M.A., **Brachiopods from the Eocene La Meseta Formation of Seymour Island, Antarctic Peninsula,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.65-100, Refs. p.94-100.

The remarkably diverse brachiopod assemblage from the Eocene La Meseta Formation of Seymour I. contains 19 genera and 24 species. Four genera and 8 species are new. Some of the genera *(Basiliola, Hemithiris, Notosaria, Murravia, Stethothyris, Macandrevia)* described represent the oldest occurrences of the genus, thus extending their stratigraphical ranges. This suggests that Seymour I. might play an important role in the evolution of many brachiopod taxa from where they spread northwards before the development of the circum-Antarctic current in Oligocene. These brachiopods at the generic level show close affinities to those from New Zealand, having 9 genera in common. Fewer generic affinities exist between Tertiary brachiopod fauna of Seymour I. and southern South America. The brachiopods indicate warm to warm-temperate conditions of shallow to moderately deep marine environments which supports in general an earlier interpretation of the La Meseta Formation depositional conditions. However, the presence in the uppermost part of the formation of such warm-water genera as *Lingula* and *Bouchardia* is in contradiction with the considerable climatic cooling postulated on the basis of oxygen isotopic data. (Auth. mod.)

E-55909

Baumiller, T.K., Gaździcki, A., **New crinoids from the Eocene La Meseta Formation of Seymour Island, Antarctic Peninsula,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.101-116, Refs. p.114-116.

The excellent record of marine invertebrates from the Eocene La Meseta Formation of Seymour I. includes several well-preserved crinoids. Two crinoid species have been previously reported from the upper part of the La Meseta Formation; here the authors describe 3 additional taxa from the lower units of this formation: an isocrinid, *Eometacrinus australis* gen. et sp. n., a comatulid, *Notocrinus seymourensis* sp. n., and a cyrtocrinid, *Cyathidium holopus* Steenstrup, 1847. These data are important in providing new information for the time-environment distribution of crinoids and for constraining phylogenetic hypotheses and evolutionary scenarios. The co-occurrence of these 3 taxa is unusual because sedimentological, stratigraphic and paleoecological evidence suggests that the lower part of the La Meseta Formation was deposited in a shallow-marine setting, whereas today, isocrinids, cyrtocrinids, and comatulids co-occur only in deep water. Also, the morphology of *E. australis* indicates that the syzygial articulation between the first and second primibrachials, thought to represent a character of primary phylogenetic importance among the Isocrinidae, may have evolved more than once. (Auth.)

E-55910

Radwańska, U., **New echinoid from the Eocene La Meseta Formation of Seymour Island, Antarctic Peninsula,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.117-125, Refs. p.124-125.

A new cidaroid echinoid is described from the lowermost part of La Meseta Formation (Eocene) on Seymour I. It is represented by several specimens of the new species, *Austrocidaris seymourensis* sp. n., of the subfamily Ctenocidarinae Mortensen, 1928, hitherto known from the living forms, and one uncertain occurrence from the Eocene of Patagonia. Coming from an extremely shallow-marine habitat, the new species indicates that the extant genus *Austrocidaris* H.L. Clark, 1907, escaped a vertical shift into greater depths after the Eocene time, a feature typical of other marine faunas recorded in La Meseta Formation. (Auth.)

E-55911

Doktor, M., Gaździcki, A., Jerzmańska, A., Porębski, J., Zastawniak, E., **Plant-and-fish assemblage from the Eocene La Meseta Formation of Seymour Island (Antarctic Peninsula) and its environmental implications,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.127-146, Refs. p.144-146.

Fossil floral remnants (leaves and shoots) belonging to *Cladophlebis* sp., *Dacrycarpus? tertiarius* (Berry) Zastawniak comb. n., *Araucaria nathorsti* Dusén, *Nothofagus* sp., *Knightiophyllum andreae* (Dusén) Zastawniak comb. n., *Dicotylophyllum* sp., and co-occurring with the clupeoid fish *Marambionella andreae* Jerzmańska and with other teleost remains, were recovered from the lower part of the Eocene La Meseta Formation of Seymour I. This flora is indicative of a temperate climate and resembles mostly the present-day araucarian forest, with *Nothofagus* and Podocarpaceae of the Argentine-Chilean borderland. The well-preserved flora assemblage, accompanied by clupeoid fish skeletons together with sedimentological data, are all consistent with the estuarine origin of the La Meseta Formation. (Auth.)

E-55912

Gaździcki, A., Webb, P.N., **Foraminifera from the *Pecten* Conglomerate (Pliocene) of Cockburn Island, Antarctic Peninsula,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.147-174, Refs. p.171-174.

The *Pecten* Conglomerate was first proposed and described by Andersson (1906) at a type locality on Cockburn I., a small island situated between James Ross and Seymour islands. In the present investigation of the foraminifera, the diversity has been augmented to 19 genera and 24 species. The assemblage contains only calcareous benthic taxa. Agglutinated and planktic taxa are not present. Rich assemblages of macrofauna and microfauna/flora in the *Pecten* Conglomerate provide a biotope of more than 100 species. High energy, coastal marine environments with water depths not exceeding 50 m are deduced from foraminiferal and other paleontological data. The foraminiferal assemblage is correlated with almost identical Pliocene assemblages from the Wright and Taylor Valleys, the McMurdo Sound, and Larsemann Hills near Prydz Bay. Diatoms which co-occur with the Cockburn I. foraminifera indicate an age of 2.8-2.0 Ma (Late Pliocene) and K/Ar radiometric ages of 3.65 and 2.8 Ma (Late Pliocene) were obtained from basalts which underlie and possibly overlie the *Pecten* Conglomerate. Paleontological data indicate deglacial/interglacial conditions at latitude 64°S in the Antarctic Peninsula, and support arguments favoring relatively mild polar climate in many parts of Antarctica during the Pliocene. (Auth. mod.)

E-55913

Szczechura, J., Błaszyk, J., **Ostracods from the *Pecten* Conglomerate (Pliocene) of Cockburn Island, Antarctic Peninsula,** *Palaeontologia Polonica,* 1996, No.55, Palaeontological results of the Polish antarctic expeditions. Part 2. Edited by A. Gaździcki, p.175-186, Refs. p.184-186.

Sixteen species of Ostracoda, belonging to 15 genera and 8 families, representing Podocopina only, are described from the Pliocene *Pecten* Conglomerate of Cockburn I. Four species are referred to still living species, 4 are regarded as close to those inhabiting antarctic waters and the southwest Atlantic today, while the remainder appear to be endemic. The fauna suggests an environment similar to that presently existing in Antarctica. Some of the genera i.e. *Patagonacythere* and *Australicythere,* described here for the first time from the Pliocene of the Southern Hemisphere, are known from the Plio-Pleistocene of the Northern Hemisphere. They indicate bipolar distribution of the ostracod faunas in the Pliocene. (Auth.)

E-55921

Fulford-Smith, S.P., Sikes, E.L., **Evolution of Ace Lake, Antarctica, determined from sedimentary diatom assemblages,** *Paleogeography, palaeoclimatology, palaeoecology,* Aug. 1996, 124(1-2), p.73-86, 26 refs.

The sediments in Ace Lake in the Vestfold Hills contain a continuous sequence of diatom frustules that record the lake's history since its formation during the retreat of continental ice more than 9200 years ago. Frustules from six indicator groups were used to determine the sequence of the lake's evolution. The history of the lake falls into five stages. Ace Lake began as a marine inlet influenced by dynamic mixing of ocean and meltwater inputs. As the ice sheet retreated, isostatic uplift isolated the lake, allowing it to be flushed by meltwater input from the retreating ice sheet. Over the course of 800 years the lake became meromictic supporting a freshwater diatom assemblage. Approximately 6700 years ago, coinciding with antarctic sea level maxima, diatom assemblages indicate that seawater flooded over the sill into Ace Lake, disturbing the freshwater meromixis. The sediments in this period were laminated and contained elemental sulphur suggesting that the marine input was limited in extent and energy. Approximately 5500 years ago this marine input ceased and the lake again became a meromictic basin which stabilized over 1700 years to become the lake that it is today and has been with little change for about the past 4000 years. (Auth. mod.)

E-55922

Kiernan, V., Hecht, J., Cohen, P., Concar, D., **Did Martians land in Antarctica,** *New scientist,* Aug. 17, 1996, 151(2034), p.4-5.

A team of NASA researchers claimed to have found traces of organisms that may have lived on Mars bya. The scientists conclude that the tiny structures they see in the meteorite are "evidence for primitive life on early Mars". At the center of the claim is ALH84001, a meteorite weighing 1.9 kg collected in 1984 from the Allan Hills region of Antarctica. Astronomers believe that ALH84001 was chipped off Mars 15 mya when an asteroid or comet crashed into the planet, sending small pieces hurtling into space with enough force to escape Mars's gravity. About 13,000 years ago, this chunk of rock wandered close enough to Earth to be sucked into our planet's gravitational field and to fall onto the antarctic ice sheet. Most scientists agree with this much of the story. The doubts creep in over the analysis of the rock's makeup. (Auth. mod.)

E-55927

Welch, K.A., Lyons, W.B., Graham, E., Neumann, K., Thomas, J.M., Mikesell, D., **Determination of major element chemistry in terrestrial waters from Antarctica by ion chromatography,** *Journal of chromatography A,* July 1996, 739(1-2), International Ion Chromatography Symposium 1995, Dallas TX, USA, 1-5 October 1995. Edited by D.J. Pietrzyk, p.257-263, 9 refs.

As part of the new Long Term Ecological Research (LTER) project in the McMurdo Dry Valleys, a systematic aqueous geochemical sampling program has been undertaken. A series of terrestrial water samples has been collected and analyzed for major ion chemistry by ion chromatography. The concentrations of ions cover a wide range of total dissolved solids (TDS) from relatively pristine glacier ice to hypersaline lake waters. Some of the challenges which are encountered while trying to collect and analyze samples covering a wide range of concentrations in such a hostile environment are discussed. (Auth.)

E-55942

Swithinbank, C., **Location of blue ice runway sites—report on air photo search,** U.S. Army Cold Regions Research and Engineering Laboratory. CRREL project No.88-4a, Aug. 1988, n.p., 3 refs.

The author examined some 7,000 aerial photographs obtained for mapping purposes by the U.S. Navy for the U.S. Geological Survey in Antarctica between latitudes 84°S and 88°S, longitudes 160°E and 120°W. While thousands of km^2 of essentially snow-free bare ice are identifiable, most are unsuitable for large wheeled aircraft because of slope, grade change, length, crevasses, or obstructed approaches. However, all these factors were predicatable and expected. The same problems were encountered in both areas where earlier (successful) searches were made for bare ice runways. Ice sheets and outlet glaciers are driven by gravity flow: slopes are normal and over many areas exceed reasonable criteria for transport aircraft. The only possible landing place where the surface is completely level is a frozen lake with dimensions of 1x4 km at 85° 25'S, 147° 40'W. This should be investigated. (Auth. mod.)

E-55946

De Oliveira, W.J., Barrocas, S.L.S., Braun, O.P.G., De Souza Pontes, C., Nunes Gusso, G.L., **Geology of Seymour I. from Spot images** [Contribuição à geologia da ilha de Marambio - Antártica, através do uso de imagens Spot], *Academia Brasileira de Ciencias. Anais,* 1990, Vol.3, Brazilian Remote Sensing Symposium, 6th, Manaus, Brazil, June 24-29, 1990, p.690-696, In Portuguese with English summary. 3 refs.

DLC G70.39.S55 1990

Satellite images used to carry out geological surveys of Seymour I. in the summer of 1989-1990 were analyzed. Four physiographic provinces were defined and related to the known sedimentary formations and the processed images allowed the correlation between the relief and sedimentary formations and the geologic structures. Besides the quaternary sediments, the following formations outcrop on the island: López de Bertodano (Campanian-Paleocene), Sobral (Paleocene) and Cross Valley formations, which form the Marambio group, and the La Meseta Formation (Upper-Eocene). Problems found during data processing and a brief description of the island stratigraphy are given. (Auth. mod.)

E-55948

William, C., **Lake Vostok—freshwater time capsule,** *Geotimes,* Sep. 1996, 41(9), p.6-7.

Scientists conducting radio-echo surveys of ice depths over central East Antarctica in the 1970s discovered evidence of a huge subglacial, freshwater lake. Early estimates set the lake's dimensions at about 10,000 km^2. An international team of scientists led by A.P. Kapitsa (Moscow State University) recently revised those figures upward by almost 50%—to 14,000 km—and suggested new details about the bodies of water lying beneath Antarctica's frozen epidermis. Named for its proximity to Vostok Station, a Russian research base in East Antarctica about 1,200 km from the South Pole, Lake Vostok is comparable in size to Lake Ontario and in depth, perhaps even to Lake Baikal in Siberia. Researchers now theorize that the lake is part of a vast hydrological system of about 70 subglacial lakes in central Antarctica. Kapitsa and colleagues used radar altimetry and radio-echo studies, combined with old seismic data, to show that the water of Lake Vostok is virtually free of salts and reaches depths of at least 510 m, making it one of the world's 10 deepest lakes. Depending on the lake's deep circulation, the water may date back some 50,000 years. (Auth.)

E-55950

Genge, M.J., Grady, M.M., Hutchison, R., **Evidence in a glassy cosmic spherule from Antarctica for grazing incidence encounters with the Earth's atmosphere,** *Meteoritics & planetary science,* Sep. 1996, 31(5), p.627-632, 30 refs.

Cosmic dust accreted by the Earth can be extensively reprocessed during atmospheric encounters. The textures and compositions of reprocessed material provide important constraints by which the processes affecting extraterrestrial matter in the Earth's atmosphere can be better understood. Here the authors report results on an unusual antarctic glassy cosmic spherule that demonstrates strong textural evidence for at least two grazing incidence encounters with the Earth's atmosphere prior to final reentry. The particle consists of a central glassy core with four peripheral glass lobes that transect a silicate particle rim. The texture of the particle confirms previous theoretical speculations that some high velocity, low incidence angle interplanetary particles experience numerous encounters with the Earth's atmosphere and also indicates that micrometeorites demonstrating multiple melting episodes should be interpreted with caution. (Auth. mod.)

E-55968

Macchiaroli, P.E., **Resolving aspects of past glaciations by dating exposed rock surfaces using ^{26}Al and ^{10}Be produced *in situ*; Wright Valley, southern Victoria Land, Antarctica and the southeasternmost ridge of the Appalachian Mountains, northeast United States,** Philadelphia, University of Pennsylavania, 1995, 161p., University microfilm order No. DA95-43117, Ph.D. thesis. Refs. p.149-158.

Recent histories of glaciations along the southeasternmost ridge of the Appalachian Mountains, United States and along the Wright Valley, Antarctica were determined in quartz produced by cosmic-rays. Measurements were made by accelerator mass spectrometry (AMS). To compare the glacial dynamics along the coastal and inland areas of Wright Valley, 76 samples were collected from Mt. Fleming, Mt. Orestes, and terrain adjacent to and protruding through the Wilson Piedmont Glacier (WPG). Exposure times for Mt. Fleming indicate that while the summit has been ice-free for at least 5.5 Ma, the lower slopes have experienced more recent ice cover. Samples from Mt. Orestes reveal an erosion-controlled western slope and an alpine-glaciated southern slope; the summit has been ice free >1.9 Ma. The most-recent withdrawal of ice from the terrain adjacent to the WPG began >84 ka ago; an earlier period of ice withdrawal occurred >260 ka ago. Calculated maximum erosion rates range from 0.02-15.22 mm/ka. (Auth. mod.)

E-55975

Askin, R.A., Spicer, R.A., **Late Cretaceous and Cenozoic history of vegetation and climate at northern and southern high latitudes: a comparison,** Studies in Geophysics: Effects of past global change on life. (Board on Earth Sciences and Resources, Commission on Geosciences, Environment, and Resources, National Research Council), Washington, D.C., National Academy Press, 1995, p.156-173, Refs. p.169-173.

DLC QE720.E32 1995

The Late Cretaceous and Cenozoic high-latitude land vegetation bequeathed a sensitive paleobotanical and palynological record of regional and global environmental change. Foliar physiognomy provides the most reliable indicators. This record is frequently available for northern localities, augmented by wood and palynomorph data. Southern data are provided mainly by palynomorphs, with some foliar, cuticular, and wood information. The northern high-latitude vegetation was mainly deciduous, whereas evergreen taxa locally predominate in the south. Major northern clades were all derived from lower latitudes; in contrast, Antarctica was a center of evolutionary innovation and dispersal. Differences in northern and southern vegetation are a function of continental configurations, interrelated with continentality (winter-summer temperature range), seasonality, moisture/aridity regimes, sea-level cycles, and overprinted by biotic stress or selective mechanisms. Vast land areas encircled the North Pole (to within 85°N), enhancing climatically driven northward and southward migrations, whereas an antarctic continent continuously occupied the South Polar latitudes, had relatively restricted dispersal corridors, and became increasingly isolated as the other Gondwana fragments spread northward. (Auth.)

E-55989

Satterwhite, C., Lindstrom, M., **Newsletter,** *Antarctic meteorite,* Aug. 1996, 19(2), 16p.

This newsletter announces the availability of 194 new meteorites, mostly from the 1994 ANSMET collection. It also announces the first 8 meteorites from the 1995 collection. Included among these samples are 3 irons, 2 mesosiderites, 2 carbonaceous chondrites, 3 type 3 ordinary chondrites and 6 achondrites (1 ureilite and 5 HED). The most unusual is diogenite GRO95555. It has the mineralogy of a diogenite, but its unbrecciated, unshocked granular texture is unique.

E-55997

Quilty, P.G., ed, **Climate succession and glacial history of the Southern Hemisphere over the past five million years,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Oct. 1995, No.94, 39p., Refs. passim.

This is a collection of abstracts of papers presented at a symposium convened by the Tasmanian Division of the Australian and New Zealand Association for the Advancement of Science. The symposium was based on greatly enhanced knowledge of the Cenozoic glacial record in Tasmania, and development in Tasmania of a research focus into the evolution of the Late Neogene record in Antarctica through geological and glaciological research.

E-56015

Francis, J.E., Hill, R.S., **Fossil plants from the Pliocene Sirius Group, Transantarctic Mountains: evidence for climate from growth rings and fossil leaves,** *Palaios,* Aug. 1996, 11(4), p.389-396, 24 refs.

Fossil wood and leaves occur within the Sirius Group in Antarctica, a sequence of Pliocene glacial sediments that crop out in the Transantarctic Mountains. Growth forms and tree rings in the wood and the morphology of the leaves indicate that these plants were deciduous dwarf trees that developed a prostrate habit with branches which spread across the ground surface. Comparison with growing conditions and habits of prostrate shrubs at similar high latitudes in the arctic today suggests that mean annual temperatures in the Transantarctic Mountains were well below freezing, probably about -12°C, with short summer growing seasons with temperatures of around 5°C. This estimate for the Late Pliocene climate of Antarctica is considerably cooler than previous estimates based on these fossil plants. (Auth. mod.)

E-56018

Crame, J.A., **New oxytomid bivalve from the Upper Jurassic-Lower Cretaceous of Antarctica,** *Palaeontology,* Aug. 1996, 39(pt.3), p.615-628, 41 refs.

Praeacaucellina umbonoradiata gen. et sp. nov. is a small pteriomorph bivalve from the Upper Jurassic-Lower Cretaceous of Antarctica which can be referred to the family Oxytomidae, within the superfamily Monotoidea. Sub-rounded to strongly obliquely elongated in outline, it is markedly inequivalve. There is now a considerable volume of morphological and stratigraphical evidence to suggest close phylogenetic ties with Late Jurassic-Early Cretaceous genera such as *Aucellina* and *Oxytoma.* While elucidation of the features of *Praeaucellina* helps to consolidate the taxonomic differences between the Oxytomidae and Buchiidae, it highlights further possible similarities between the former of these categories and the Monotidae. Resolution of phylogenetic relations within the Monotoidea will greatly assist studies of the evolution of Mesozoic high-latitude bivalve faunas. (Auth. mod.)

E-56021

Wannamaker, P.E., Stodt, J.A., Olsen, S.L., **Dormant state of rifting below the Byrd Subglacial Basin, West Antarctica, implied by magnetotelluric (MT) profiling,** *Geophysical research letters,* Oct. 15, 1996, 23(21), p.2983-2986, 13 refs.

During the 1994-95 austral summer field season, the authors collected 12, high-quality MT soundings over the Byrd Subglacial Basin of central West Antarctica. Ten equispaced sites in a 54 km profile cross regional aeromagnetic trends and complement seismic reflection and refraction results collected by others. Objectives were to prove such measurements were feasible over the 2 km thick interior ice sheet, and to show from deep electrical resistivity whether the Byrd Basin comprises an active rift environment. The difficult acquisition of electric field data on ice was overcome using a custom electrometer system, with preamplifiers located at the electrode sites to buffer the high contact impedances of the ice as close to the source as possible. Two-dimensional modeling of the profile shows that resistivity of the deep crust and upper mantle is about 2000-3000 ohm-m to 100 km depth or more. This is much higher than observed in active extensional regimes, suggesting that the current state of rifting, at least in this part of central West Antarctica, is dormant. (Auth. mod.)

E-56049
Klepeis, K.A., Lawver, L.A., **Tectonics of the Antarctic-Scotia plate boundary near Elephant and Clarence Islands, West Antarctica,** *Journal of geophysical research,* Sep. 30, 1996, 101(B9), p.20,211-20,231, 56 refs.

Over 5,000 km of new bathymetric data collected from near the northern Antarctic Peninsula show the morphology of an irregular segment of the Antarctic-Scotia plate boundary and nearby Shetland microplate. Bathymetric data, single-channel seismic reflection profiles, and Geosat/ERS 1 free air gravity data show a southeast trending fault zone on the northeast side of a prominent ridge in the Shackleton fracture zone (SFZ). Southeast of a termination of the SFZ ridge at the South Shetland Trench, the fault zone subdivides into segments displaying steep scarps and canyons. These data suggest that (1) recent changes in the configuration of the antarctic plate near the Antarctic Peninsula caused a segment of the SFZ transform to adjust to a more stable, rectilinear geometry with the South Scotia Ridge transform, and (2) diffuse transtension resulting from current Antarctic-Scotia relative motion is dissecting the Shetland microplate near Elephant and Clarence islands and transferring slivers of the Scotia plate onto the antarctic plate. (Auth. mod.)

E-56058
Turner, S.P., Kelley, S.P., VandenBerg, A.H.M., Foden, J.D., Sandiford, M., Flöttmann, T., **Source of the Lachlan fold belt flysch linked to convective removal of the lithospheric mantle and rapid exhumation of the Delamerian-Ross fold belt,** *Geology,* Oct. 1996, 24(10), p.941-944, 31 refs.

During the Cambrian-Ordovician the paleo-Pacific margin of Gondwana underwent a rapid transition from a site of convergent deformation (Delamerian-Ross orogeny) to one of sedimentation during which the thick turbiditic sequences of the adjacent basal Lachlan fold belt were deposited. Laser-probe ^{40}Ar-^{39}Ar data show that the synkinematic (523-486 Ma), mid-crustal I- and S-type granites and metamorphic country rocks of the Australian Delamerian fold belt were rapidly cooled at 490-485 Ma, coincident with the intrusion of a suite of high-level, postkinematic A-type granites and gabbros (ca. 497-481 Ma). This scenario implies a causative link, which the authors infer to have been convective removal of lithospheric mantle following orogenic thickening. The model is analogous to the Tertiary uplift of the India-Asia orogen. (Auth. mod.)

E-56089
Zhu, C., Cui, Z.J., Zhang, J.X., **Relationship between the distribution of periglacial landforms and glaciation history, Fildes Peninsula, King George Island, Antarctica,** *Permafrost and periglacial processes,* Jan.-Mar. 1996, 7(1), p.95-100, With French summary. 9 refs.

Three kinds of profile assemblage features on Fildes Peninsula, King George I., show that periglacial landforms have an internal relationship in genesis. For example, where there is a rich weathering debris, the dominant landforms are talus, black slopes, mass movement features, and mega-grained sorted forms. Where the debris material is silty, fine-grained periglacial forms (for example, gelifluction steps and striated soils) dominate. Where the debris source is limited, talus only appears at the southeast side of periglacial tors and hilltops; the major periglacial forms are striated soils and muddy sorted circles. In general, periglacial landforms show a difference between stoss and leeward slopes. (Auth. mod.)

E-56113
Woodburne, M.O., Case, J.A., **Dispersal, vicariance, and the Late Cretaceous to Early Tertiary land mammal biogeography from South America to Australia,** *Journal of mammalian evolution,* June 1996, 3(2), p.121-161, Refs. p.156-161.

A review of paleontological, phyletic, geophysical, and climatic evidence leads to a new scenario of land mammal dispersal among South America, Antarctica, and Australia in the Late Cretaceous to early Tertiary epochs. New material from Seymour I. (Microbiotheriidae) indicates the presence there of a derived taxon that resides in a group that is the sister taxon of most Australian marsupials. There is no compelling evidence that dispersal between Antarctica and Australia was as recent ca. 41 Ma or later. The derived marsupial and placental land mammal fauna of Seymour I. shows its greatest affinity with Patagonian forms of Casmayoran age (ca. 51-54 m.y.). This suggests an earlier dispersal of more pleisomorphic marsupials from Patagonia to Australia via Antarctica, and vicariant disjunction subsequently. This is consistent with geophysical evidence that the South Tasman Rise was submerged by 64 Ma and with geological evidence that a shallow water marine barrier was present from then onward. (Auth. mod.)

E-56114
Bralower, T.J., Parrow, M., **Morphometrics of the Paleocene coccolith genera *Cruciplacolithus, Chiasmolitus,* and *Sullivania*: a complex evolutionary history,** *Paleobiology,* Summer, 1996, 22(3), p.352-385, Refs. p.384-385.

The authors have applied the SEM-IAS to study the evolution of Paleocene coccolith genera *Cruciplacolithus, Chiasmolithus* and *Sullivania.* A variety of detailed measurements have been made on over 4,000 coccoliths from the temperate North Atlantic and Ocean Drilling Program Site 690 in the Weddell Sea. Results indicate no simple relationships between morphocharacters, the shapes of all 3 genera are both complex and highly variable. Although most morphocharacters possess little phylogenetic significance, the areas of different shield cycles show gradual divergence between *Chiasmolithus* and *Sullivania* through the Paleocene. Change of most other morphocharacters occurs at variable rates and reversals in trends are common. Minimal correlation exists between the trends and oscillatory shape changes observed at the two sites. It is concluded that these trends and oscillations represent local, transitory ecophenotypic variation of the complex form. There is little stasis in the ten-million-year record studied. (Auth. mod.)

E-56175
Domack, E.W., Domack, C.R., **Cenozoic glaciation: the marine record established by ocean drilling,** Washington, D.C., Joint Oceanographic Institutions, Inc./U.S. Science Support Program, [1992], 49p., Refs. p.46-48.

This booklet covers the results of 5 Ocean Drilling Program high-latitude cruises, 2 in the Northern Hemisphere (Legs 104 and 105) and 3 in the Southern Hemisphere (Legs, 113, 119, and 120). An introductory series of topics is covered in the first section of this booklet, providing background information on ocean drilling, marine geology, and glaciology. Another section is arranged by cruise (Leg 104-Norwegian Sea, Leg 105-Labrador Sea and Baffin Bay, Leg 113-Weddell Sea, Leg 119-Prydz Bay, and Leg 120-Kerguelen Plateau) and is devoted to the description and interpretation of specific site data. The evidence provided from the marine sedimentary record indicates that cryospheric development in the Southern Hemisphere (Antarctica) preceded that in the Northern Hemisphere by at least 30 m.y. The temporal disparity in the onset of ice cover between the hemispheres is due, in large part, to the geographic and oceanographic isolation of the antarctic continent.

E-56177
Yoshida, M., et al, **Cambrian orogenic belt in East Antarctica and Sri Lanka: implications for Gondwana assembly: a discussion,** *Journal of geology,* July 1995, 103(4), p.467-471, Includes reply. 32 refs. For pertinent paper see E-50282.

The authors discuss the accuracy of a prior paper devoted to antarctic crustal metamorphism and Gondwana continental shifts.

E-56178
Smellie, J.L., Roberts, B., Hirons, S.R., **Very low- and low-grade metamorphism in the Trinity Peninsula Group (Permo-Triassic) of northern Graham Land, Antarctic Peninsula,** *Geological magazine,* Sep. 1996, 133(5), p.583-594, Refs. p.592-594.

The Permo-Triassic Trinity Peninsula Group is a widespread, regionally metamorphosed metasedimentary sequence in northern Graham Land, which forms the local 'basement' to the mainly Jurassic-Cretaceous Antarctic Peninsula magmatic arc. The metamorphic grade, thermal evolution and pressure series of this major tectono-stratigraphical unit are largely unknown. Using white mica (illite) crystallinity of interbedded mudrocks, the Trinity Peninsula Group is now shown to have been pervasively altered mainly at anchizonal and epizonal grades.

Outwith thermal aureoles near plutonic intrusions, the alteration temperatures ranged mainly from 250 to 325°C, exceeding 300°C in the highest-grade parts of the sequence. Unroofing and substantial erosion of the Trinity Peninsula Group took place during polyphasal vertical tectonic movements linked to the development of the magmatic arc in northern Graham Land. The geological setting of the Trinity Peninsula Group could have been a foreland (or back-arc) basin or the mid- to upper levels of an accretionary prism. (Auth. mod.)

E-56179

Frey, F.A., McNaughton, N.J., Nelson, D.R., deLaeter, J.R., Duncan, R.A., **Petrogenesis of the Bunbury Basalt, western Australia: interaction between the Kerguelen plume and Gondwana lithosphere?,** *Earth and planetary science letters,* Oct. 1996, 144(1-2), p.163-183, 58 refs.

Subsequent to the initial rifting of Greater India from Australia/Antarctica at ca. 132 Ma, widespread early Cretaceous volcanism occurred on the continental margins. One example is Bunbury Basalt in western Australia, which erupted in the Perth Basin, a fault-bounded trough separating Archaean and Proterozoic crust. On the basis of spatial distribution, age, petrography, and geochemical characteristics the Bunbury Basalt is divided into two lava types: Casuarina and Gosselin. Although the isotopically extreme Gosselin lavas have higher MgO contents than Casuarina lavas, their compositions reflect fractional crystallization at lower pressures than Casuarina lavas. The present-day Sr and Nd isotopic ratios in Casuarina lavas are similar to those in younger lavas from the Ninetyeast Ridge and Kerguelen Archipelago which define the Kerguelen hotspot track. Although it is possible that the Bunbury Basalt is a response to long-term incubation of the plume beneath eastern Gondwana, the eruption ages of Bunbury lavas (123 and 130 Ma) significantly exceed the oldest measured ages (ca. 110-115 Ma) for the large igneous province (Kerguelen Plateau) associated with the plume. (Auth. mod.)

E-56181

Zhivago, A.V., **Geomorphology and geological history of Broken Ridge in eastern Indian Ocean** [Geomorfologiia i geologicheskaia istoriia khrebta Broken (Zapadno-Avstraliĭskogo) v vostochnoĭ chasti Indiĭskogo okeana], *Akademiia nauk SSSR. Institut okeanologii. Trudy,* 1985, Vol.121, p.7-23, In Russian with English summary. Refs. p.23-24.

DLC GC1.A4 1985

Summarized geological and geomorphological data obtained by the R/V *Dmitry Mendeleev* (25th cruise, 1980) in the eastern part of the Indian Ocean are presented. Materials from stations, dredging and deep-sea drilling were examined in great detail to determine the morphostructure of the Broken Ridge and the volcanic Bezrukov seamount resting on its crest. Tectonic transformations and stages of the geological history of the Broken Ridge and the Kerguelen Plateau were studied in connection with the spreading of southeastern Indian Ridge, which has undergone a series of evolutionary cycles when the Indo-Australian lithospheric plate was shifting to the north. (Auth. mod.)

E-56182

Borisova, I.A., **Initial stages of the spreading between Australia and Antarctica based on a propagating rift model** [Interpretatsiia rannikh etapov spredinga mezhdu Avstralieĭ i Antarktidoĭ s tochki zreniia modeli prodvigaiushchikhsia riftov], *Akademiia nauk SSSR. Institut okeanologii. Trudy,* 1985, Vol.121, p.168-174, In Russian with English summary. 20 refs.

DLC GC1.A4 1985

The geological history of propagating rifts during the sea-floor spreading between Australia and Antarctica is reviewed, and the tectonic regimes from the earliest stages of rifting in the southeastern sector of the Indian Ocean are described.

E-56208

Wilhelm, S, Wörner, G., **Crystal size distribution in Jurassic Ferrar flows and sills (Victoria Land, Antarctic): evidence for processes of cooling, nucleation, and crystallisation,** *Mineralogy and petrology,* Sep. 1996, 125(1), p.1-15, Refs. p.14-15.

Jurassic Ferrar rocks in Victoria Land occur predominantly as basaltic or andesitic flows and sills. Both show characteristic petrographical and chemical variations, which can be related to *in-situ* differentiation processes. Such characteristics have been investigated at one flow ("Colonnade flow") and one sill ("Thumb Point sill") in the Prince Albert Mountains based on a statistical grain size analysis and the application of the crystal size distribution theory. A third magma body ("HiTi-unit"), which in previous literature was described as a flow, does not show clear similarities to either the flow or sill. Sill and flow are *in-situ* differentiated with accumulation of silicic residual melt in the latest cooled parts. For the flow, this part is located in the lower half, and for the sill, in the upper third of their thickness. Thumb Point sill additionally shows an accumulation zone of olivine in the lower third. The position of the residual melt accumulation zone is an indicator for an origin as flow or sill. (Auth. mod.)

E-56246

Barkov, N.I., Nikolaev, V.I., Strizhov, V.P., **Origin of mirabilite in McMurdo Sound area** [O genezise mirabilita v raĭone zaliva Mak-Mërdo (Antarktida)], *Litologiia i poleznye iskopaemye,* July-Aug. 1995, No.4, p.415-420, In Russian. 26 refs.

In the light of new results of investigations on oxygen-isotope composition of natural ice and mirabilite in moraine sediments of McMurdo Sound area, the genesis of these salts is discussed. It is concluded that the salt sources are primarily marine as well as endogenic, which precludes their use in paleogeographic reconstructions.

E-56250

Birkenmajer, K., **Trinity Peninsula Group (Permo-Triassic?) at Paradise Harbour, Antarctic Peninsula,** *Studia geologica polonica,* 1992, Vol.101, p.7-25, With Polish summary. 22 refs.

The Trinity Peninsula Group (Permo-Triassic?) at Paradise Harbour, Danco Coast, Antarctic Peninsula, is represented by the Paradise Harbour Formation (PHF) (new unit), more than 1000 m thick. It is subdivided into 3 members: the Almirante Brown Member (ABM), more than 500 m thick; the Skontorp Cove Member (SCM) about 200 m thick; and the Mount Inverleith Member (MIM), 100-300 m thick. This is a marine clastic succession, corresponding to distal turbidite facies (ABM and SCM), and to distal submarine delta (MIM). The whole succession is devoid of body megafossils and microfossils. The PHF was strongly folded close to the Triassic-Jurassic boundary when SE-vergent thrust faults were formed. During the Jurassic-earliest Cretaceous time, the formation was subject to strong erosion and weathering, then unconformably covered by a huge pile of Cretaceous basic lavas, finally intruded by Cretaceous granitoids and late-magmatic acidic and basic dyke complex. Refolding of the PHF toegether with its lava cover, and SE-vergent thrusting of the whole complex, took place in Late Cretaceous. (Auth. mod.)

E-56251

Birkenmajer, K., **Volcanic succession at Deception Island, West Antarctica: a revised lithostratigraphic standard,** *Studia geologica polonica,* 1992, Vol.101, p.27-82, With Polish summary. Refs. p.78-81.

New lithostratigraphic standard is proposed for the Quaternary volcanic succession at Deception I. The succession is subdivided into the older Foster Group which includes pre-caldera volcanics, and the younger Hawkes Group which includes syn-caldera and post-caldera volcanics and volcanic forms. The Foster Group consists of 4 formations: the Entrance; Cathedral; Stonethrow; and the Window. The Hawkes Group consists of 7 formations: the Murature; Ronald; Collins; Chacao; Casco; Kirkwood; and the Telefon. The Telefon Formation (three phases) relates to the 1967-1970 volcanic activity; the Kirkwood Formation includes the 1842 event and the events between 1829 and 1912; all older formations pre-date 1829. (Auth. mod.)

E-56259

Ramsay, D.C., Colwell, J.B., **Rig seismic research cruise 2: Kerguelen Plateau, southern Indian Ocean, initial report,** *Australia. Bureau of Mineral Resources, Geology and Geophysics. Report,* 1986, No.270, 41p. + maps and charts, Refs. p.22-23.

DLC QE340.A392

The Kerguelen Plateau cruise was the second in a series of research cruises to be undertaken by the Bureau of Mineral Resources under its new initiative in marine geoscience. Approximately 5500 km of high-quality multichannel seismic data and 15,000 km of gravity and magnetic data were recorded on the R/V *Rig Seismic* during a 58-day period in Mar.-Apr. 1985. The general cruise ojectives were to elucidate the structure, stratigraphy, and tectonic framework of this mid-ocean feature. Initial interpretation of the data indicates that the plateau to the north of Heard I. is asymmetric. The eastern margin is a largely sediment-free steep slope buttressed by volcanic intrusions. The central part of the plateau is underlain by adjoining sedimentary basins that are strongly intruded under the eastern half of the plateau and bounded by apparently uplifted blocks of magnetic basement on the western margin. To the west, the plateau descends gradually to the abyssal depths of the Enderby Basin. Magnetic and gravity data acquired over the plateau strongly reflect the nature, configuration and depth of basement. (Auth. mod.)

E-56260

Janecek, T.R., ed, **Descriptions of sediment recovered by the R/V *Polar Duke*, United States Antarctic Program, cruise II, 1992 to the Antarctic Peninsula,** *Florida State University. Antarctic Marine Geology Research Facility. Contribution,* Aug. 1996, No.4, 95p., Refs. p.85-89.

This volume contains the descriptions of sediments recovered by the R/V *Polar Duke* during cruise 2 in 1992 (referred to as cruise PD92-II). Cruise PD92-II (Mar. 19, 1992 to Apr. 15, 1992) was conducted in the waters along the west coast of the Antarctic Peninsula to investigate the depositional and paleoclimatic history within the fjords and offshore basins. Over 3450 km of cruise trackline bathymetry (12 kHz profiler) and 960 km of HUNTEC seismic data were collected. A total of 25 piston cores, 26 trigger cores, 9 Kasten cores, 4 gravity cores and 5 Smith-McIntyre grab samples were retrieved during the cruise. Included are a summary of the scientific objectives and preliminary results of cruise PD92-II, a table and maps of station locations, a table listing ^{14}C dates for several cores, a discussion of core recovery and processing, an explanation of laboratory descriptive procedures, lithologic and smear-slide descriptions of piston, trigger, and gravity cores, and several appendices containing information on how to obtain samples from cores stored at the Antarctic Research Facility.

E-56276

Martinez Macchiavello, J.C., Tatur, A., Servant-Vildary, S., Del Valle, R., **Holocene environmental change in a marine-estuarine-lacustrine sediment sequence, King George Island, South Shetland Islands,** *Antarctic science,* Dec. 1996, 8(4), p.313-322, Refs. p.321-322.

Sedimentological features and cluster analysis of diatom assemblages were used to investigate a local Holocene prograding sequence of marine-estuarine-lacustrine sediments. It consists of upward finning and thinning sediment cycles formed at the mouth of a meltwater stream during regional isostatic uplift, which followed early Holocene deglaciation and marine inundation events. The sequence begins in the lower Holocene sublittoral sand (marine diatoms and abundant molluscs) overlying, with a transgressive base, the deltic (?) clastic sediment marking probably one of the pre-Holocene interglacial periods (index diatom *Actinocyclus ingens* suggests an age >0.62 Ma). The lower Holocene marine sand was truncated by middle Holocene gravity flows, bearing volcanic ash. They were deposited in a high energy estuarine environment (brackish diatoms). The beach subsequently formed separated the estuary from the sea and changed it into a freshwater lake. Accumulation of moss and gyttja, containing a freshwater diatom assemblage, marks the final late Holocene stage of this coastal sedimentary sequence, which can be considered as typical for deglaciation periods in the maritime Antarctic. (Auth.)

E-56278

Roberts, D., McMinn, A., **Relationships between surface sediment diatom assemblages and water chemistry gradients in saline lakes of the Vestfold Hills, Antarctica,** *Antarctic science,* Dec. 1996, 8(4), p.331-341, Refs. p.338-340.

The relationship between surface sediment diatom assemblages and measured limnological variables in 33 coastal antarctic lakes was examined by constructing a diatom-water chemistry dataset. Canonical correspondence analysis revealed that salinity and silicate each explain significant amounts of variation in the distribution and abundance of the surface sediment diatom taxa. Salinity has the strongest influence, revealing its value for limnological inference models in this coastal antarctic region. (Auth.)

E-56283

Bronge, C., **Hydrographic and climatic changes influencing the proglacial Druzhby drainage system, Vestfold Hills, Antarctica,** *Antarctic science,* Dec. 1996, 8(4), p.379-388, Refs. p.387-388.

Freshwater drainage systems, fed by melting of nearby inland ice and perennial snowdrifts, exist in the southeastern part of arid, ice-free, coastal Vestfold Hills. Most important is the complex Druzhby system. A water-balance was calculated for 1990-91. The system went through 4 seasonal phases of which only one displayed a fully developed external drainage. The relative duration of those phases can vary considerably from one year to another. The system depends critically on the water supply from ice-dammed Chelnok Lake. Exposed to excessive evaporation, the large Krok Lake could become internally drained and reach a new equilibrium in ca. 830 years. A Krok Lake sediment core can be interpreted as suggesting this occurred during the Holocene. The idea, inferred from striae, of a late Holocene Chelnok Glaciation reaching the northern shores of Krok Lake is questioned. Instead, it is suggested that the Chelnok striae originate from local basal melting of the ice sheet draining southward into a deglaciated Sørsdal trough. At present, runoff is determined by opposing short and long-term climatic influences. (Auth. mod.)

E-56284

Elliot, D.H., **Hanson Formation: a new stratigraphical unit in the Transantarctic Mountains, Antarctica,** *Antarctic science,* Dec. 1996, 8(4), p.389-394, Refs. p.393-394.

The stratigraphy of the upper part of the Upper Palaeozoic-Lower Mesozoic Victoria Group in the central Transantarctic Mountains is reviewed. Marked lithologic contrasts exist in the Falla Formation between the lower volcanic-poor part and the upper volcaniclastic part. The name Falla Formation is here restricted to the lower volcanic-poor part of the sequence making it the youngest formation in the Victoria Group. The upper volcaniclastic part, a tuffaceous sequence, is named Hanson Formation. (Auth.)

E-56286

Hervé, F., Lobato, J., Ugalde, I., Pankhurst, R.J., **Geology of Cape Dubouzet, northern Antarctic Peninsula: continental basement to the Trinity Peninsula Group?,** *Antarctic science,* Dec. 1996, 8(4), p.407-414, 16 refs.

Cape Dubouzet is mainly composed of a volcanic-subvolcanic complex of extrusive rhyolitic breccias, a banded rhyolite and a semi-annular body of dacite porphyry rich in xenoliths of metamorphic rocks. Major and REE geochemistry indicate that the volcanic rocks are calc-alkaline and that they are genetically related by fractional crystallization of a plagioclase-bearing assemblage from a common magma. Rb-Sr data suggest that the rhyolitic complex is of Middle-to-Late Jurassic age, and that it is intruded by Late Cretaceous stocks of banded biorite and gabbro. Xenoliths in the dacite porphyry suggest that the northern tip of the Antarctic Peninsula is underlain by a metamorphic complex composed of amphibolites, meta-tonalites and pelitic gneiss containing garnet, sillimanite, cordierite, hercynite, and andalucite. Such rocks are not known in the Scotia metamorphic complex, nor in the Trinity Peninsula Group. Both the Jurassic-Cenozoic magmatic arc of the Antarctic Peninsula and the accretionary complex rocks of the Trinity Peninsula Group were developed, at least in part, over pre-existing continental crust. (Auth. mod.)

E-56294

Vaughan, A.P.M., Millar, I.L., **Early cretaceous magmatism during extensional deformation within the Antarctic Peninsula Magmatic Arc,** *Journal of South American earth sciences,* Jan./Mar. 1996, 9(1/2), p.121-129, With Spanish summary. Refs. p.128-129.

Early Cretaceous plutonic rocks at Creswick Peaks, Antarctic Peninsula show evidence of syn-magmatic crustal extension and deformation during emplacement and cooling at 141±2 Ma. Deformation textures, ranging from sub-magmatic phenocryst alignment to ultramylonite, are preserved in granodiorite. Large volumes of gabbro were intruded late in the kinematic history. Crustal extension compensated by magma emplacement has occurred, and a close correspondence of ages between the shear zone, granodiorite and gabbro suggests a rapid phase of crustal growth. Extensional structures are partially overprinted by mid-Cretaceous thrusting and compression. (Auth.)

E-56303

Wasell, A., **Diatom-stratigraphy in the sediments of "Skua Lake," Horseshoe Island, Antarctic. Preliminary report,** International Diatom Symposium, 11th, San Francisco, California, Aug. 12-17, 1990. Proceedings. Edited by J.P. Kociolek and Memoirs of the California Academy of Sciences, No.17, San Francisco, California Academy of Sciences, 1994, p.517-524, 18 refs.

DLC Q11.C17 Vol.17

During the Swedish Antarctic expedition (SWEDARP 88-89) to the Antarctic Peninsula several lakes were cored and sampled for reconstruction of polar depositional environments, Skua Lake among them. Skua Lake's level is ca. 3.5 m a.s.l. and the surface area is c. 0.025 km^2. Several short cores (50-80 cm) were obtained from the lake. One of the longest cores was described and sampled in the field, and diatom assemblages have been analyzed approximately every 6 cm. The lowermost part between 80 and 50 cm shows a presence of marine diatoms, both neritic and sea ice species. The start of limnic conditions in the sediment core (20-0 cm) is marked by a peak in the frequencies of *Gomphonema angustatum* (Kützing) Rabenhorst, *Cocconeis japonica* (Hustedt) A. Cleve, and *Fragilaria virescens* Ralfs. Problems connected with radiocarbon datings are discussed. (Auth. mod.)

E-56304

Parra, M., Chapuy, B., Pons, J.C., Latouche, C., Tranquille, M., **Infrared spectrometry of biogenic silica, smectites and plagioclases in sediments from the Kerguelen Plateau** [Determination par spectrometrie infrarouge de la silice biogenique, des smectites et des plagioclases constituant la fraction fine des sediments du Plateau Kerguelen-Heard (océan Indien austral)], *Bordeaux. Université. Institut de géologie du bassin d'Aquitaine. Bulletin,* 1991, No.49, p.5-13, In French with English summary. 10 refs.

DLC QE268.B587a

The qualitative determination by infrared spectrometry of smectites and plagioclases in quaternary fine-grained sediments from the Kerguelen Plateau was realized with spectral substraction by shifting out of the biogenic silica absorption. It is also possible to quantify with a good precision (10%) these minerals and the biogenic silica with curves of absorbance/percentage standardization with standard materials. The smectites are often very abundant (25-64%) and are always Mg-rich aluminous nontronites. The biogenic silica is also sometimes very abundant (13-54%). The plagioclase feldspars are scarce (2-18%). The conformity of chemical and structural composition with mineralogical characteristics show that the analytic data of infrared spectrometry from amorphous silica-rich clay fractions like the austral ocean sediments are very reliable. (Auth.)

E-56305

Palamarczuk, S., Gamerro, J.C., ***Grapnelispora evansii*, Late Cretaceous megaspore from Argentina and Antarctica** [*Grapnelispora evansii*, megaspora del Cretácico Superior (?Campaniano Superior-Maastrichtiano) de Argentina y Antártida], Congreso Argentino de Plaeontología y Bioestratigrafía, 4th, Mendoza, Nov. 23-27, 1986. Simposio. Paleobotánica y Palinología del Mesozoico y Terciario. Actas 3, edited by W. Volkheimer, Mendoza, CONICET, 1988, p.87-93, In Spanish with English summary. 12 refs.

DLC QE921.S56

Grapnelispora evansii Stover and Partridge 1984, a megaspore, is reported for the Allen (Late Campanian-Early Maastrichtian) and Jagüel (Maastrichtian) Formations in Neuquen Province, and López de Bertodano Formation (?Late Campanian-Early Maastrichtian) on Seymour I. *G. evansii* is a palynomorph with a distinctive morphology, very similar to some Devonian spores of the "Ancyrospora" type, possessing appendages with grapnel-like tips, uncommon for a Mesozoic assemblage. Its stratigraphic and paleogeographic importance is analyzed, taking into account these findings and those from Australia and New Zealand in more or less coeval sediments. (Auth.)

E-56308

Birkenmajer, K., Zastawniak, E., **Plant remains of the Dufayel Island Group (Early Tertiary?), King George Island, South Shetland Islands (West Antarctica),** *Acta paleobotanica,* 1986, 26(1-2), p.33-54, With Polish summary. Refs. p.48-50.

DLC QE901.A3

Remains of fossil plants preserved as leaf impressions collected at Dufayel I. are described and illustrated. The fossil plants derive from tuffs of the Dalmor Bank Formation belonging to the upper part of the Dufayel Island Group. Basaltic andesite lava capping these tuffs yielded a K-Ar date of 51.9±1.5 Ma, while altered andesite lavas underlying the plant-bearing beds of 56.8±1.2 Ma. This may suggest an Early Eocene or Early Eocene-Late Paleocene age of the plant fossil assemblage in case these lavas have not been reheated at a later date. In the latter case, a late Cretaceous age is equally possible. The fossil plant assemblage, consisting predominantly of angiosperm leaf impressions, is characterized by the presence of *Nothofagus* sp., *Myrtaceae,* and various remains of laurophyllous plants. They are accompanied by leaf remains of: aff. *Cochlospermum, ?Dodonea, Leguminosites, ?Sterculia, Tetracera patagonica* Berry, as well as by monocotyledonous and probably pteridophyte remains. No gymnosperm remains have been found. (Auth. mod.)

E-56316

Weisberg, M.K., et al, **K (Kakangari) chondrite grouplet,** *Geochimica et cosmochimica acta,* Nov. 1996, 60(21), p.4253-4263, 44 refs.

The Kakangari, LEW 87232, recovered from Lewis Cliff, and Lea Co. 002 chondrites have a similar set of petrologic and oxygen isotopic characteristics that distinguishes them from other chondrite groups. They are here established to constitute a single chondrite grouplet—the K (after Kakangari) chondrites. The K chondrites studied here are unequilibrated petrologic type 3 and are therefore K3 chondrites. K chondrites are not affiliated with any of the three—E, O, or C—chondrite classes but have some characteristics that are similar to those of each class. Their characteristics also do not fit the concept that the petrologic and chemical properties of chondrite groups are a smooth function of formation at specific heliocentric distances from the sun. (Auth. mod.)

E-56318

Traube, V.V., **Petrographic composition of coarsely-fragmented material from bottom sediments of the Weddell Sea shelf** [Petrograficheskiĭ sostav grubooblomochnogo materiala iz donnykh osadkov shel'fa moria Ueddella, Antarktika], Sedimentogenez i konkretsieobrazovanie v okeane. Sbornik nauchnykh trudov. (Sediment genesis and nodule formation in the ocean. Collection of papers). Edited by S.I. Anreev, Leningrad, Sevmorgeologiia, 1986, p.22-31, In Russian. 9 refs.

DLC GC380.15.S43 1986

Based on analysis of data collected in the Weddell Sea during the 28th Soviet Antarctic Expedition in 1983, the distribution of glacial deposits and their petrographic composition and history were determined and are described. Tabulated results are presented.

E-56331

Anders, E., et al, **Evaluating the evidence for past life on Mars,** *Science,* Dec. 20, 1996, 274(5295), p.2119-2125, For the paper under discussion, see E-55622. All participants in this discussion may be contacted at their institutions shown in the correspondence. Numerous refs.

The paper by D.S. McKay *et al.* on the antarctic meteorite ALH84001 has sparked a lively discussion that covers the width and breadth of the USA and extends to Hawaii. Polycyclic aromatic hydrocarbons (PAHs) seem to be at the root of disagreement among the various discussants who favor a different interpretation of the data from that of McKay *et al.*

E-56336

Boucher, L.D., **Morphometric and paleobiogeographic analyses of *Dicroidium* from the Triassic of Gondwana,** Columbus, Ohio State University, 1995, 209p., University Microfilms order No.96-12154, Ph.D. thesis. Refs. p.79-98.

Spatial variation and temporal dynamics of paleoecosystems are important factors in understanding how biotas react to environmental change over geologic time. The Mesozoic was a time of globally mild climate and changing floras. Paleoenvironmental reconstructions of the Triassic in the Southern Hemisphere are dependent on an understanding of the dominant floral element, *Dicroidium,* a foliage type that has been assigned to the Corystospermales, a Mesozoic seed fern group. The objectives of this study included identifying *Dicroidium* specimens from Antarctica and other Gondwana localities using both morphological and cuticular features, evaluating the use of morphometric techniques in classifying form species, and analyzing the paleobiogeography of *Dicroidium* species for the antarctic and entire Gondwana region. Paleobiogeographical analyses provided information regarding the spatial and temporal distribution of the plants that bore *Dicroidium* foliage. Results imply that the distribution of *Dicroidium* was influenced more by climatic than spatial position, and supports the interpretation of a more heterogeneous biota in Gondwana than previous reconstructions have suggested. (Auth. mod.)

See also:
A-55104 A-55506 A-55507 B-54195 B-54389
B-54605 B-54611 B-54991 B-55209 B-55311 B-55408
B-55463 B-55511 B-55741 B-55777 B-55897 B-56088
B-56267 B-56297 B-56302 C-54943 C-55278
C-55430 F-54068 F-54096 F-54102 F-54106 F-54107
F-54457 F-54498 F-54561 F-54565 F-54578 F-54909
F-54971 F-55081 F-55082 F-55517 F-55563 F-55600
F-55918 F-55923 F-55940 F-55947 F-56172
F-56285 G-54977 G-56080 I-54352 I-54656 I-55253
I-55269 I-55642 I-55677 I-55678 I-55803 J-54053
J-54267 J-54299 J-54344 J-54436 J-54560 J-54655
J-54787 J-54859 J-54861 J-55056 J-55060 J-55120
J-55204 J-55254 J-55479 J-55674 J-55757 J-55854
J-55972 J-56293 L-54075 L-54613 L-54614 L-54615
L-54616 L-54899 L-54934 L-55058 L-55211 L-55262
L-55263 L-55265 L-55270 L-55759 L-55878
L-55880 L-56008 L-56118 L-56134

F. ICE & SNOW

F-54044

Motoyama, H., et al, **Preliminary study of ice flow observations along traverse routes from coast to Dome Fuji, East Antarctica by differential GPS method,** *Antarctic record,* July 1995, 39(2), p.94-98, With Japanese summary. 7 refs.

Ice flow measurements were carried out along traverse routes from Showa Station to Dome Fuji, 1992-1994, using the differential GPS (Global Positioning System) method. This positioning method is easier to use in the field than the satellite doppler positioning system (JMR) or triangle chain method. The vertical and horizontal error of positioning was within 1 ppm of base line. The horizontal speed and direction of ice flow were almost the same each year at each site. (Auth. mod.)

F-54045

Narita, H., et al, **Development of the JARE deep ice coring system (II),** *Antarctic record,* July 1995, 39(2), p.99-146, In Japanese with English summary. Refs. p.145-146.

A deep ice coring system, which is to be used at Dome Fuji Station at the summit of the Queen Maud Land ice sheet in 1995 and 1996, has been under development since 1988. The mechanical system was designed to reduce power consumption and weight. Many experiments were carried out on parts of the system in a cold laboratory. Simultaneously, field experiments of the drill system were done at Dome GRIP, Greenland ice sheet and at Rikubetsu, Hokkaido. As a result, an electro-mechanical drill which is simple both in shape and mechanism can be designed and produced, incorporating many new ideas introduced through the experiments. (Auth.)

F-54048

Motoyama, H., Enomoto, H., Miyahara, M., Watanabe, O., **Shallow ice coring and borehole casing at Dome Fuji Station, East Antarctica,** *Antarctic record,* July 1995, 39(2), p.189-197, With Japanese summary. 5 refs.

A Deep Ice Coring Project at Dome Fuji, East Antarctica has been conducted by the Japanese Antarctic Research Expedition (JARE) since 1992. Shallow ice coring of 112 m in depth and casing of its borehole at Dome Fuji Station were carried out in Dec. 1993 and Jan. 1994 by JARE-34. The characteristics of snow densification showed similar features to those on Mizuho Plateau. The penetration rate of ice cutting can potentially provide useful information on physical properties of ice. (Auth.)

F-54049

Hirasawa, N., Yamanouchi, T., Ejiri, M., **Report on Workshop "Study of the Polar Atmosphere and Cryosphere using Remote-Sensing Data",** *Antarctic record,* July 1995, 39(2), p.198-204, In Japanese with English summary. 2 refs.

A workshop on recent results of polar atmosphere/cryosphere research, using remote-sensing data and their algorithms, held on Jan. 25, 1995 at the National Institute of Polar Research (NIPR) is reviewed. The following was discussed: sea ice distribution; the velocity field of pack ice migration in the vicinity of Showa Station; albedo variations in a glacier and a part of the ice sheet, using NOAA AVHRR data; some effects of the radius of snow particles in the accumulated snow layer; dust contamination and propagation of ice algae; some features of the surface and near surface structure of the antarctic ice sheet; an algorithm for detection of cloud, sea ice and ice sheet around Showa Station using NOAA AVHRR data; the relationship between hemispheric-scale atmospheric circulation in the Southern Hemisphere and the distribution pattern of OLR (Outgoing Longwave Radiation, calculated by NOAA AVHRR data) over Antarctica; numerical modeling which takes into account multi-scattering in the snow/ice layer; influence on the albedo at the snow/ice surface for some parameters of ice particle size; and the number of accumulated snow layers. (Auth. mod.)

F-54060

Drinkwater, M.R., Hosseinmostafa, R., Gogineni, P., **C-band backscatter measurements of winter sea-ice in the Weddell Sea, Antarctica,** *International journal of remote sensing,* Nov. 20, 1995, 16(17), p.3365-3389, 20 refs.

During the 1992 Winter Weddell Gyre Study, a C-band scatterometer was used from the German ice-breaker R/V *Polarstern* to obtain detailed shipborne measurement scans of antarctic sea-ice. Calibrated backscatter data were recorded for several ice types as the icebreaker crossed the Weddell Sea and detailed measurements were made of corresponding snow and sea-ice characteristics at each measurement site, together with meteorological information, radiation budget and oceanographic data. The primary scattering contributions under cold winter conditions arise from the air/snow and snow ice interfaces. Smooth white ice found in 1992 in divergent areas within the Weddell Gyre ice pack was generally extremely smooth and undeformed. Comparisons of field scatterometer data with calibrated 20-26 incidence ERS-1 radar image data show close correspondence, and indicate that rough antarctic first-year and older second-year ice forms do not produce as distinctively different scattering signatures as observed in the Arctic. Thick deformed first-year and second-year ice on the other hand are clearly discriminated from younger undeformed ice, thereby allowing successful separation of thick and thin ice. Time-series data also indicate that C-band is sensitive to changes in snow and ice conditions resulting from atmospheric and oceanographic forcing and the local heat flux environment. Variations of backscatter occur in response to a combination of thermally-regulated parameters including sea-ice brine volume, snow and ice complex dielectric properties, and snow physical properties. (Auth. mod.)

F-54061

Viehoff, T., Li, A., **Iceberg observations and estimation of submarine ridges in the western Weddell Sea,** *International journal of remote sensing,* Nov. 20, 1995, 16(17), p.3391-3408, 24 refs.

A number of small patches of relatively high temperatures and low reflectances were observed in the western and southwestern Weddell Sea between Oct. 1991 and Feb. 1994 by use of Advanced Very High Resolution Radiometer (AVHRR) images. From ERS-1 Synthetic Aperture Radar (SAR) data acquired during the same period these patches could be identified as high backscatter areas in the lee of small icebergs. Most of the icebergs were grounded for the entire period of observation. North of the icebergs a number of extended bands (>100 km) of high backscatter and low reflectance were detected in most of the images. These bands demonstrate the effect of the icebergs as fixed barriers on the drifting ice cover creating a perturbation in the lee of the barriers. From the analysis of the shadows created by the tabular icebergs a rough estimation of the heights of the icebergs and the corresponding draughts could be made, which were then used for an estimation of the submarine topography responsible for the grounding of the icebergs. These indirect measurements are the first made on the continental shelf off the Antarctic Peninsula. They indicate a submarine ridge of about 150 to 300 m water depth nearly perpendicular to the coastline. (Auth. mod.)

F-54062

Thomas, J.P., Turner, J., Lachlan-Cope, T.A., Corcoran, G., **High resolution observations of Weddell Sea surface currents using ERS-1 SAR sea-ice motion vectors,** *International journal of remote sensing,* Nov. 20, 1995, 16(17), p.3409-3425, 16 refs.

Two areas of the Weddell Sea were chosen for a preliminary investigation of sea-ice motion tracking from ERS-1 Synthetic Aperture Radar (SAR) images during the austral summer. In the 3-day period between SAR images the atmosphere warmed near the surface, which led to significant changes in radar backscatter from, and thus in contrast between, ice floes and the areas between them. The tracked features were clearly identified in images which were sub-sampled at one-sixteenth of the full resolution available. In the southern Weddell Sea images, many large floes were present which allowed a quite detailed pattern of the surface water circulation to be mapped as the ice motion was predominantly forced by the ocean currents during a period of low surface wind speeds. In the western Weddell Sea images good tracers were hard to find, but it was still possible to detect the edge of the western boundary current of the Weddell Gyre. Continuous monitoring of sea-ice motion in these two areas using SAR imagery could be a useful means of detecting changes in surface water flow which may be linked to the rate of formation of antarctic bottom water. (Auth. mod.)

F-54065

AMANDA Collaboration, **On the age vs depth and optical clarity of deep ice at the South Pole,** *Journal of glaciology,* 1995, 41(139), p.445-454, 46 refs.

The first four strings of phototubes for the AMANDA high-energy neutrino observatory are now frozen in place at a depth of 800-1000 m in ice at the South Pole. During the 1995-96 season, as many as six more strings will be deployed at greater depths. Provided absorption, scattering and refraction of visible light are sufficiently small, the trajectory of a muon into which a neutrino converts can be determined by using the array of phototubes to measure the arrival times of Cherenkov light emitted by the muon. To help in deciding on the depth for implantation of the six new strings, models of age vs depth for South Pole ice are discussed. Mean free paths for scattering from bubbles and dust as a function of depth are estimated and distortion of light paths due to refraction at crystal boundaries and interfaces between air-hydrate inclusions and normal ice are assessed. It is concluded that the interval 1600-2100 m will be suitably transparent for a future 1 km^3 observatory except possibly in a region a few tens of meters thick at a depth corresponding to a peak in the dust concentration at 60 k year BP. (Auth. mod.)

F-54066

Cavalieri, D.J., St. Germain, K.M., Swift, C.T., **Reduction of weather effects in the calculation for sea-ice concentration with the DMSP SSM/I,** *Journal of glaciology,* 1995, 41(139), p.455-464, 10 refs.

A problem in mapping the sea-ice covers in both the Arctic and Antarctic has been the sporadic false indication of sea ice over the open ocean and at the ice edge. These spurious sea-ice concentrations result from variations in sea-surface roughening by surface winds, atmospheric water vapor and both precipitating and non-precipitating liquid water. This problem was addressed for sea-ice concentrations derived from the Nimbus-7 scanning multi-channel microwave radiometer (SMMR) data through the development of a weather filter based on spectral information from the vertical polarization SMMR channels. Application of a similar filter for use with sea-ice concentration maps derived with the special-sensor microwave imager (SSM/I) sensor is less successful. The SSM/I 19.35 GHz channels are more sensitive to changes in atmospheric water vapor, which results in greater contamination problems. An additional filter has been developed, based on a combination of SSM/I channels. Examples of the effectiveness of the new filter are presented and limitations are discussed. (Auth. mod.)

F-54067

Goodwin, A.H., Vaughan, D.G., **Topographic origin for double-ridge features in visible imagery of ice divides in Antarctica,** *Journal of glaciology,* 1995, 41(139), p.483-489, 18 refs.

The appearance of double-ridge features on visible imagery of the ice divides of antarctic ice rises has often been noted but, largely due to a lack of adequate ground truth, their origins have remained enigmatic. This paper presents several examples of ice rises and other isolated ice-flow centers that apparently show double ridges, including Fletcher Promontory. A digital-elevation model (DEM) of the summit region is derived from surface profiles obtained using the Global Positioning System (GPS) and this is correlated with Landsat MMS satellite imagery. Precise registration is achieved by correlating image-brightness values with surface slope calculated along the direction of the Sun azimuth in the image. Using a simple bi-directional relation, the DEM data are used to model the Landsat image. This demonstrated that the double ridge is a product of a subtle concavity parallel to the ridge and is unlikely to be dependent on other factors. This concavity is not predicted by steady-state models of ice divides. The ridge may not be in a steady-state but responding to changes in the glaciological boundary conditions, an indication of ongoing migration of the ice divide. (Auth. mod.)

F-54068

Fowler, A.C., Johnson, C., **Hydraulic run-away: a mechanism for thermally regulated surges of ice sheets,** *Journal of glaciology,* 1995, 41(139), p.554-561, 29 refs.

By using a simple parameterized model of thermomechanically coupled flow in cold ice sheets, together with a physically based sliding law which includes a description of basal drainage, it is shown that relationships between ice flux and ice thickness can be multi-valued, and hence that hydraulically induced surges can occur. This mechanism is termed hydraulic run-away, as it relies on the positive feedback between sliding velocity and basal melt production. For this feedback to operate, it is essential that water pressure increases with water storage. This is consistent with various recent ideas concerning drainage under ice sheets, be it through a system of canals, a distributed film or a subglacial aquifer. For confined flows, such as valley glaciers (e.g. Trapridge Glacier) or topographically constrained ice streams (e.g. Hudson Strait in the Laurentide ice sheet), which are underlain by sufficiently deformable sediment, thermally regulated surges are expected, while in a laterally unconfined drainage basin (such as that which flows into the Ross Ice Shelf), ice streams may develop. (Auth. mod.)

F-54096

Echelmeyer, K., Cassidy, W., Schutt, J., **Measurements of ice thickness and related studies on the Lewis Cliff Ice Tongue, 1993-1994,** *Antarctic journal of the United States,* 1994, 29(5), p.53-55, 2 refs.

The Lewis Cliff Ice Tongue is a 2x10 km patch of exposed ice that terminates in a large moraine below Mount Achernar. The authors have recovered approximately 2,000 meteorite specimens on this and adjacent ice surfaces, with the highest concentration located on the ice tongue itself; therefore, they are interested in characterizing this ice tongue with a view to learning its origin and history. Specifically, during the early part of the 1993-94 field season, they were interested in the transverse and longitudinal variations in ice thickness and how these patterns relate to the flow of the ice tongue and, ultimately, to the distribution of meteorites on the surface. Additional work was also carried out to determine if an ice-stratigraphic sequence is exposed on the surface of the ice tongue. The results for three profiles are shown in a figure. The profiles show an overall ice depth of about 400 to 500 m.

F-54097

Bentley, C.R., Burkholder, P.D., Clarke, T.S., Liu, C., Lord, N., **Geophysical experiments on Ridge B1/B2, Siple Coast,** *Antarctic journal of the United States,* 1994, 29(5), p.57-59, 9 refs.

Geophysical field experiments were carried out during the 1993-94 austral summer on the ridge of nearly stationary ice, known as the "Unicorn," that lies between ice streams B1 and B2. The "Unicorn" is bounded by the marginal shear zones of the two ice streams, called the "Heffalump" and the "Dragon," respectively. The base camp, OutB, was situated across the "Dragon" from station UpB, the site of many measurements during several previous field seasons. The overall purpose of this study was to examine the characteristics of the ice and its bed and to search for contrasts with ice stream B2 that might help to understand the nature of the lateral transition zone between regions of slow (approximately 5 m/y) and fast (approximately 500 m/yr) ice movement. The geophysical program comprised seismic, radar, and electrical resistivity experiments spread out over much of the "Unicorn".

F-54098

Harrison, W., Echelmeyer, K., **Temperature measurements in the margin of ice stream B, 1993-1994,** *Antarctic journal of the United States,* 1994, 29(5), p.60-61, 4 refs.

The low shear stress at the bottom of ice stream B suggested by soft subglacier sediment samples acquired by the California Institute of Technology near UpB Camp and recent theoretical analyses of transverse profiles of velocity across the ice stream indicate that the margins of the ice stream probably play a significant role in its force balance, perhaps exerting more drag on the ice stream than the bed itself. Because the ice stream is wide relative to its thickness (the ratio is roughly 35:1), this situation would require a large shear stress at the margins of the ice stream, large enough that the effects of strain heating there should be detectable by temperature measurements within the ice. The most important unknowns are the rate of convergence of ice into the ice stream (the rate controls the residence time of the ice in the active part of the margins), the stability of the positions of the margins, and the shear stress itself. These ideas are being examined in ice stream B by a program of temperature measurements in the margins and a surveying program to improve knowledge of the rate of convergence of the ice into the ice stream. The work began in the south margin near UpB Camp in 1992-93 and continued at OutB in 1993-94. Preliminary results indicate that the heating rate implies high shear stress, high enough to be important in the force balance of the ice stream as predicted.

F-54099

Alley, R.B., **Progress in ice-stream basal modeling,** *Antarctic journal of the United States,* 1994, 29(5), p.61-62, 26 refs.

A traverse down the flank of ridge BC and onto ice stream B, West Antarctica, shows a fivefold reduction in gravitational driving stress, an order-of-magnitude decrease in basal shear stress, but an increase in ice velocity by two orders of magnitude. Extreme basal lubrication beneath the ice stream is the only physically plausible explanation. Predictive models of the antarctic ice sheet and other past or present ice sheets must address this remarkable behavior. Here, the author summarizes some recent advances leading toward a model of efficient basal lubrication. He points out that fast iceflow is not synonymous with efficient basal lubrication—east antarctic and Greenlandic outlet glaciers and ice streams achieve high velocities largely through internal deformation of the ice owing to great thicknesses and high basal shear stresses.

F-54100

Jacobel, R.W., Dorsey, C.W., Harner, A.M., **Ice velocities near a relict flow feature on Siple Dome,** *Antarctic journal of the United States,* 1994, 29(5), p.62-66, 3 refs.

Advanced very-high-resolution radiometer (AVHRR) imagery of the western Ross Embayment shows a linear feature crossing the northwest flank of Siple Dome, the ridge separating ice streams C and D. Bindschadler and Vornberger (1990) have tentatively identified this as a possible relict ice stream margin, traversing an area which today is interstream ice. This would indicate a different configuration of these ice streams in the past and has important implications for the behavior of the west antarctic ice sheet. In an effort to gain more information about this relict margin feature, the authors have made enhancements of AVHRR imagery to gain greater spectral resolution. They have also used repeat Landsat thematic mapper (TM) scenes and the methods developed by Bindschadler and Scambos (1991) to determine surface-ice velocities at one location near the relict margin. They are presently engaged in fieldwork to study the relict margin area using surface-based ice-penetrating radar to examine the continuity of internal layers, and geodetic surveying to measure ice velocities and strain rates.

F-54101

Jacobel, R.W., Grommes, B.J., **Internal layer folding patterns from radar studies of ice streams B and C,** *Antarctic journal of the United States,* 1994, 29(5), p.66-68, 8 refs.

The authors have continued studies of the folding patterns of internal layers seen in ground-based radar studies of ice streams B and C. The echoes from these layers arise from changes in the dielectric properties of ice due to deposition of debris on the ice surface. Therefore, the internal layers represent isochrones that can be analyzed to gain clues about ice dynamics. Recent work has focused on the three-dimensional nature of the fold structures because the authors have found that there is also considerable deformation in the direction transverse to flow, and this deformation needs to be incorporated into an understanding of ice-stream dynamics. A figure shows two intersecting radar profiles acquired at the downstream B location, one approximately along the flow direction and the other transverse to it. The same prominent fold in the internal layers can be seen in both profiles. This can be the case only if the actual fold structure trends oblique to the flow direction and the profiles depict a projection of the fold on each axis.

F-54102

Licht, K., Jiang, X., **Preliminary data from western Ross Sea cores: part of an investigation of long-term ice-sheet stability,** *Antarctic journal of the United States,* 1994, 29(5), p.68-70, 6 refs.

Recent studies of the West Antarctic ice sheet and the Ross Ice Shelf have identified variable iceflow rates, unstable bed-ice sheet coupling, and the presence of water-saturated deforming sediments beneath ice stream B. This evidence indicates that the west antarctic ice sheet is likely to be unstable and may have been so during the Late Quaternary. To address the issue of long-term ice-sheet stability, research efforts at INSTAAR are focusing on the extent of west antarctic ice sheet expansion during the last glacial maximum, subglacial sediments associated with ice advance, and the timing of ice-sheet retreat. This article discusses analyses that have been completed on existing cores stored at the Florida State University Antarctic Research Facility and analysis of new cores acquired during a 1994 cruise of the *Nathaniel B. Palmer* to the Ross Sea.

F-54103

Wahlen, M., **Reconstruction of atmospheric carbon dioxide and isotopic carbon-13 dioxide from air occluded in ice cores from Greenland and Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.71-72, 5 refs.

Measurements of the carbon dioxide (CO_2) mixing ratio and isotopic carbon-13 dioxide ($\delta^{13}CO_2$) in the air extracted from ice cores from Greenland and from Antarctica (Vostok) are reported. The goals are to determine the phasing between temperature and atmospheric CO_2 changes during periods of different climatic conditions and to gain insight into the mechanisms producing the observed CO_2 variations. The Vostok ice core (5G) was examined for CO_2 for the penultimate glacial-to-interglacial transition between 2,000 and 1,840 m depth, corresponding to about 140,000 to 128,000 years ago. A fairly smooth transition in CO_2 from glacial (180-200 ppm) to interglacial (about 290 ppm) values is indicated in a figure.

F-54104

Whung, P.Y., Saltzman, E.S., Gross, G.W., **Uptake of methanesulfonate and sulfate in ice,** *Antarctic journal of the United States,* 1994, 29(5), p.73-75, 4 refs.

Methanesulfonate (MSA) is an atmospheric oxidation product of dimethyl sulfide; the latter is produced by phytoplankton in the surface ocean. Because of its biogenic origin, MSA can be used as a biological tracer in studies of atmospheric sulfur chemistry. The ratio of MSA to total non-seasalt sulfur has been used as an indicator for various atmospheric sulfur sources. Due to differences in physicochemical properties of MSA and sulfate, postdepositional processes could alter this fraction. Specifically, the authors address the question of whether there is a difference in the distribution coefficients ($Conc._{ice}/Conc._{water}$) of MSA and of sulfate. They also study the effect of ammonia on the uptake of MSA and sulfate in ice.

F-54105

Gross, G.W., Svec, R.K., Whung, P.Y., **Dielectric response of ice growth from dilute sulfate solutions,** *Antarctic journal of the United States,* 1994, 29(5), p.75-76, 2 refs.

The present work aims at obtaining baseline data on dielectric response of sulfate in ice columns (=20-25 cm, ϕ=3.8 cm) grown in the laboratory under quasi-equilibrium conditions. Trapping of solute in grain boundaries is minimized by continuous stirring of the melt. For sulfate concentration and electrical measurements, the columns were sliced in approximately 1.5 cm increments. Three dielectric relaxation parameters (principal relaxation time, high-frequency conductivity, and static or direct-current conductivity), measured on 6 ice samples of different sulfate concentrations, are plotted against reciprocal absolute temperature (Arrhenius plots) and shown in figures.

F-54106

Dawber, M., Powell, R.D., **Study of grounding-line sedimentation processes at the Mackay Glacier tongue using a remotely operated vehicle: observations on the seafloor epibenthic community,** *Antarctic journal of the United States,* 1994, 29(5), p.77-78, 7 refs.

The condition of grounding lines of polar ice sheets appears to be one of the critical factors governing ice-sheet stability. Sedimentation processes at the grounding line of the Mackay Glacier are being documented using a submersible remotely operated vehicle (ROV). The primary purposes of this study are to determine the physical processes by which terrigenous clastic sediments move from antarctic glaciers into marine environments and to estimate the volume contributed annually at the grounding line. A complement to these goals is an evaluation of epibenthic communities that may aid in the understanding of the physical and chemical characteristics of the environment near the glacier tongue. In the 1993 field season, 8 dives were made with the submersible ROV from three holes in the sea ice, two of which were located in wedge chasms on the southern margin of the glacier tongue and the third at the front of the glacier tongue. The composition of the sediments found on the seafloor beneath the Mackay Glacier Tongue is described.

F-54107

Grootes, P.M., Steig, E.J., Stuiver, M., **Taylor Ice Dome study 1993-1994: an ice core to bedrock,** *Antarctic journal of the United States,* 1994, 29(5), p.79-81, 12 refs.

Taylor Dome has been studied over the previous three field seasons to find the best location to extract an ice core to bedrock. During the 1993-94 field season, the authors recovered a 554-m long core to bedrock plus about 6 cm of basal sediment and rock debris at a site about 1.5 km (three ice thicknesses) southwest of the flow divide over a relatively flat local bedrock high. Below 335 m, they encountered brittle ice which led to internal fractures and breaks in the core and, occasionally, to badly broken or shattered core with loss of orientation. In most cases, however, the continuity of the core for orientation and sampling purposes was preserved and core loss was minimal. The oriented core makes it possible to determine the relationship between inclined layers observed in the core and in the ice radar plots. Preliminary observations of the core are described.

F-54108

Waddington, E.D., Morse, D.L., Clow, G.D., **Glacier geophysics at Taylor Dome: year 4,** *Antarctic journal of the United States,* 1994, 29(5), p.82-84, 10 refs.

Taylor Dome, centered west of the Transantarctic Mountains, is a local ice dome that supplies ice to glaciers in the McMurdo Dry Valleys. After 3 years of planning and reconnaissance to select a site, an ice core reaching bedrock at 554 m depth was recovered in Jan. 1994. Geophysical work continued at the site in 1993-94, gathering information needed to interpret the ice-core paleoclimate record accurately and to derive additional climatic data to complement the ice-core records.

F-54109

Fitzpatrick, J.J., **Preliminary report on the physical and stratigraphic properties of the Taylor Dome ice core,** *Antarctic journal of the United States,* 1994, 29(5), p.84-86, 8 refs.

During the 1993-94 austral field season, a 554 m core to bedrock was recovered from Taylor Dome drill site. Physical properties, including density, grain- and bubble-sizes, temperature, and differential ultrasonic *p*-wave velocity, were measured in the field within a few hours of core recovery in a subsurface laboratory near the drill site. The preliminary results of these analyses are presented here.

F-54128

Vihma, T., **Subgrid parameterization of surface heat and momentum fluxes over polar oceans,** *Journal of geophysical research,* Nov. 15, 1995, 100(C11), p.22,625-22,646, 67 refs.

In an analysis relevant to both polar regions, the parameterization of heat and momentum fluxes over a heterogeneous surface consisting of sea ice and large areas of open ocean (polynyas) has been studied. Various theories required to calculate grid-averaged fluxes are discussed, and a two-dimensional mesoscale boundary layer model has been applied to simulate the flow and heat exchange processes inside a single grid element of a hypothetical atmospheric general circulation model. The theories are compared with model results. With allowance for surface fluxes of sensible and latent heat, a mosaic method, based on the use of estimates for local surface temperature, air temperature, specific humidity, and wind speed over the ice-covered and ice-free parts of the grid square, performed well in the comparison. Parameterization of surface momentum flux seemed to be most reasonable on the basis of the surface pressure field and a geostrophic drag coefficient depending on the air-surface temperature difference. (Auth. mod.)

F-54129

Watkins, A.B., Simmonds, I., **Sensitivity of numerical prognoses to antarctic sea ice distribution,** *Journal of geophysical research,* Nov. 15, 1995, 100(C11), p.22,681-22,696, 28 refs.

To examine the effect of antarctic sea ice concentration upon the atmosphere on synoptic timescales, a general circulation model was used to perform a suite of 5-day forecasts. As well as using a generic July sea ice concentration, further experiments were conducted with 0, 10, 25, 50, 80, and 100% sea ice concentrations. The 100% forecast was used as the control. Results show that the central pressure, structure and tracks of individual cyclones are sensitive to the "switch on" of different sea ice conditions. Composites of all forecasts made with each concentration showed considerable and statistically significant anomalies in the surface temperatures and turbulent heat fluxes over the sea ice. The largest changes were simulated closest to the coast for all concentrations, except for the generic July sea ice run, which displayed maxima over the outer pack. Significant westerly anomalies were also induced over the ice in all cases. These results suggest that sea ice concentration induces anomalies in the atmospheric parameters in timescales of less than 5 days. Further, use of a realistic distribution of sea ice concentration produces results distinct from the constant concentration forecasts. Hence it is suggested that real-time antarctic sea ice data may be of considerable benefit to numerical weather prediction and analysis. (Auth. mod.)

F-54133

Vaughn, D., Lachlan-Cope, T., **Recent retreat of ice shelves on the Antarctic Peninsula,** *Weather,* Nov. 1995, 50(11), p.374-376, 6 refs.

Satellite photography reveals the recent rapid deterioration of the Larsen Ice Shelf on the Antarctic Peninsula. This retreat is attributed to climatic warming, but cannot be positively derived from global climatological parameters.

F-54147

Braaten, D.A., **Instrumentation to quantify snow accumulation and transport dynamics at two locations on the Ross Ice Shelf,** *Antarctic journal of the United States,* 1994, 29(5), p.86-87, 4 refs.

To obtain greater quantitative insight into the time-dependent processes of annual ice-sheet snow accumulation and transport dynamics, new instrumentation has been developed and was deployed Jan. 1994 at two Ross Ice Shelf locations influenced by different local wind regimes, but generally influenced by the same synoptic-scale storms. These sites are adjacent to the Willie Field and Ferrell automatic weather stations in the Ross I. region. This instrumentation, referred to as the microsphere dispersal system (MDS), automatically activates for a 10-second interval once every 14 days, dispersing inert, colored (high-albedo) glass microspheres with a diameter of 120 microns onto the snow surface. The microspheres act as a time marker and tracer to quantify accumulation rate and microphysical processes of snow transport, mixing, and surface feature formation which influence ice-sheet growth in a windswept environment. A schematic diagram of the pneumatic system is given.

F-54148

Andreas, E.L., Claffey, K.J., **Drifted snow affects momentum exchange over sea ice,** *Antarctic journal of the United States,* 1994, 29(5), p.89-91, 9 refs.

On Ice Station Weddell-1 (ISW-1), hourly surface level observations of many meteorological quantities were carried out almost continuously from Feb. 25 to May 29, 1992, including observations of drifting and blowing snow. The authors have combined these observations of wind-driven snow with hourly averaged wind speed at a height of 5 m and show the result in a figure, where the primary distinction is between drifting and blowing snow: drifting snow is below eye level; blowing snow is above eye level, and thus obscures visibility. The point that the figure establishes is that, on ISW-1 at fairly modest wind speeds (6-8 m/s), some form of wind-driven snow was present about 60% of the time. When the wind exceeds 6-8 m/s, it begins eroding any snowdrifts at right angles to it and deposits this snow to streamline the surface in the current wind direction. Consequently, if these high winds persist, the snow surface gets more streamlined as the drifts build.

F-54149

Shen, H.H., Frankenstein, S., **Wave-pancake ice interactions,** *Antarctic journal of the United States,* 1994, 29(5), p.91-92, 2 refs.

During the 1986 Winter Weddell Sea Project, a new mechanism for the formation of ice at the advancing edge was observed. This so-called pancake cycle begins with a high rate of ice-crystal production in a turbulent wave field. These crystals later congeal into circular-shaped floes, typically less than 1 m in diameter. These floes are called pancake ice. The presence of ocean waves is believed to be responsible for this pancake cycle. This study investigated, both experimentally and theoretically, how waves interact with individual pancake floes to form a continuous ice sheet.

F-54150

Smith, N.D., Ashley, G.M., **Observations on the melting rates of brash ice, Arthur Harbor, Antarctic Peninsula,** *Antarctic journal of the United States,* 1994, 29(5), p.92-94, 6 refs.

Observations at Arthur Harbor indicate a predominance of brash ice (i.e., less than 2 m icebergs) calving off Maar Glacier. Initial observations of iceberg distribution patterns suggested highly variable melt rates that were controlled in part by water-surface roughness. A series of exploratory experiments was therefore established to examine the rates at which brash ice melts in Arthur Harbor and, by implication, subpolar marine settings in general. Both laboratory and field observations show that melt rates of brash ice increase significantly with agitation of surrounding water. Under normal sea conditions at Arthur Harbor, most icebergs under 2 m in diameter will likely melt within 24 hours if exposed to wave attack. Under these circumstances, most ice-rafted debris will be transported only short distances from calving tidewater glaciers in subpolar regions.

F-54152

Gordon, A.L., Huber, B.A., **Western Weddell stratification and ice cover,** *Antarctic journal of the United States,* 1994, 29(5), p.97-99, 10 refs.

The southern ocean sea-ice extent is characterized by large seasonal pulsations. Much of the perennial ice is concentrated along Antarctica's coastline, with the most extensive cover in the western Weddell Sea, the Bellingshausen Sea, and the Amundsen Sea. In the western Weddell Sea, the nearly 100% concentration of perennial ice is persistent at an extent of 1.2 million km^2. The extent of the perennial ice depends on the ice drift. A number of testable hypotheses are put forward to explain why the western Weddell Sea ice cover differs from the seasonal cover to the east.

F-54158

Jacobs, S.S., **Sea-ice evolution in the Amundsen and Bellingshausen Seas,** *Antarctic journal of the United States,* 1994, 29(5), p.111-113, 6 refs.

Sea-ice retreat was one factor that led to the Feb. and Mar. 1994 Amundsen and Bellingshausen Seas cruise of the *Nathaniel B. Palmer.* Underway observations of ice extent and type were made by several groups aboard the *Palmer.* Results show that the 1994 summer ice edge did not attain the high latitude of the recent record minima but remained below the 21 year average. In both Jan. and Apr. 1994 the ice edge was farther south than during 18 of 21 prior years. The ship's relatively easy access to the Amundsen and Bellingshausen Seas coastlines suggests that the apparent northern ice-edge retreat was not simply caused by stronger southward winds compacting the sea-ice cover.

F-54163

Jenkins, A., Jacobs, S.S., Keys, H., **Is this little PIG in hot water?,** *Antarctic journal of the United States,* 1994, 29(5), p.121-122, 11 refs.

The glaciers discharging into Pine Island Bay have been the subject of controversy since Hughes (1981) noted the lack of any substantial ice shelf that could regulate the outflow. In mid-Mar. 1994, the authors measured the position and height of the terminus of Pine Island Glacier (PIG) from the *Nathaniel B. Palmer.* Preliminary results show the location of the calving front to be similar to its 1973 position. These findings seem more consistent with a steady-state condition than with thickening or surging, but this implies that a considerable volume of ice must be lost to basal melting of the floating glacier, even allowing for possible losses to surface sublimation. The authors infer a mean basal melt rate in excess of 10 m/y; this is more than an order of magnitude higher than has been estimated for the larger antarctic ice shelves. They also made a variety of oceanographic observations in Pine Island Bay, and these help to explain the probable high basal melt rate of the floating portion of PIG.

F-54184

Khalil, M.A.K., Moraes, F.P., **Linear least squares method for time series analysis with an application to a methane time series,** *Air and Waste Management Association. Journal,* Jan. 1995, Vol.45, p.62-63, 4 refs.

A simple method of time series analysis, based upon linear least squares curve fitting, is developed. The method's advantages and disadvantages are discussed, and an example is presented using the Vostok Core methane record. (Auth.)

F-54240

Rott, H., Skvarca, P., Nagler, T., **Rapid collapse of northern Larsen Ice Shelf, Antarctica,** *Science,* Feb. 9, 1996, 271(5250), p.788-792, 20 refs.

In Jan. 1995, 4200 sq km of the northern Larsen Ice Shelf, Antarctic Peninsula, broke away. Radar images from the ERS-1 satellite, complemented by field observations, showed that the two northernmost sections of the ice shelf fractured and disintegrated almost completely within a few days. This breakup followed a period of steady retreat that coincided with a regional trend of atmospheric warming. The observations imply that after an ice shelf retreats beyond a critical limit, it may collapse rapidly as a result of perturbed mass balance. (Auth.)

F-54242

Watanabe, O., ed, NIPR Symposium on Polar Meteorology and Glaciology, 17th, Tokyo, July 13-14, 1994, **Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.9,** Tokyo, National Institute of Polar Research, 1995, 209p., Refs. passim. For selected papers see F-54243, F-54244, F-54246, F-54247, F-54249, F-54251, I-54245, I-54248, I-54250 or 50-2575 through 50-2581.

This is a collection of papers presented at the 17th Symposium on Polar Meteorology and Glaciology held in Tokyo on July 13-14, 1994. It consists of 15 full-length papers, 9 pertinent to Antarctica, and 24 abstracts; the former were refereed and are arranged in the order of scientific areas of glaciology, physical oceanography and meteorology.

F-54243

Sugiyama, K., Fujita, S., Sueoka, S., Mae, S., Hondoh, T., **Preliminary measurement of high-frequency electrical conductivity of antarctic ice with AC-ECM technique,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.12-22, 14 refs.

High-frequency electrical conductivity of solid ice samples collected in the antarctic ice sheet was measured with a new technique called "AC-ECM (AC Electrical Conductivity Measurements)". The purpose was to detect variation of impurity content in ice cores with high spatial resolution and with high reproducibility for repetitive measurements. The conductance of the ice sample was measured with 2-terminal electrodes and with parallel-plate electrodes at 16 frequencies between 40 Hz and 1 MHz. Results of the conductance measured by these two different pairs of electrodes were compared to determine the physical meaning of the signals measured with the new technique. The authors could measure conductance, which is proportional to the conductivity of ice, at frequencies above 100 kHz at -20°C. The relaxation frequencies of Debye dispersion were higher when values of conductance were measured with the new technique, which suggested that surface conduction was dominant. (Auth. mod.)

F-54244

Shimamura, T., Iwashita, M., Takaku, Y., Akabane, I., Tsumura, A., Yamasaki, S., **Determination of the trace elements in a**

Mizuho ice core sample by a combination of conventional and high resolution inductively coupled plasma mass spectrometry, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.33-44, 11 refs.

Seventeen elements (Li, Na, Mg, Al, Ca, V, Cr, Mn, Fe, Ni, Co, Cu, Zn, Sr, Ba, Pb and Bi) in an ice core collected at Mizuho Station were determined by a combination of conventional and high resolution inductively coupled plasma mass spectrometry (ICP-MS). The ice sample was separated into 5 fractions from surface to inner core by stepwise melting. All the registered elements decreased from the core surface to the inner core by one to four orders of magnitude. The surface contaminations of Li, Cr, Ni, Co, Cu, Ba, Pb and Bi penetrated into the second fraction, while only the surface fraction was contaminated for Na, Mg, Al, V, Mn, Fe, Ca, and Sr. Zn kept decreasing to the innermost fraction. Na, Mg and Ca may have originated from sea water, while V, Cr, Mn, Fe, Cu, Zn and Sr may be supplied from the crust. Significant portions of Co and Ni could be of extraterrestrial origin. (Auth.)

F-54246

Maeno, H., Fujita, S., Kamiyama, K., Motoyama, H., Furukawa, T., Uratsuka, S., **Relation between surface ice flow and anisotropic internal radio-echoes in the east Queen Maud Land ice sheet, Antarctica,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.76-86, 21 refs.

The polarimetric characteristics of radar-echoes reflected in the antarctic ice sheet (internal radar-echoes) were investigated to clarify the relationship between the preferred orientation of ice crystals and the polarization of electromagnetic waves. The radar sounding was carried out with a 179 MHz sounder at 14 different sites along the oversnow traverse route from Showa Station to Dome Fuji. The internal radar-echoes reflected were found to be strongly polarized. In addition, a good correlation was found between the measured surface flow vectors and the orientation dependence of the attenuation, i.e. the antennae orientations that give the maximum attenuation are always parallel to the flow line. The differences between the maximum and minimum values of the attenuation coefficient at each site are proportional to the flow velocity. These results suggest that polarimetric radar-echo sounding is applicable to measure approximate flow vector; to investigate deeper layers by orienting the antennae perpendicular to the flow line; and to investigate the dynamics around the summit of the ice sheet. (Auth. mod.)

F-54247

Pattyn, F., Decleir, H., **Numerical simulation of Shirase Glacier, east Queen Maud Land, Antarctica,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.87-109, Refs. p.107-109.

Recent observations in the Shirase Drainage Basin show that the ice sheet is thinning at a considerable rate and that this thinning started about a few thousand years ago. In order to improve insight into the present transient behavior of the ice sheet in the Shirase Drainage Basin, a two-dimensional time-dependent flow line model was developed. By simulating the evolution of the ice sheet during a complete glacial-interglacial cycle it was possible to obtain better insight into the reaction of the ice sheet to environmental changes (temperature, sea-level and mass balance) and to calculate the present local imbalance. Investigation of the role of geothermal heating at the ice sheet base showed that changes in geothermal heat flux and the inclusion of bedrock heating did not significantly alter the overall ice sheet geometry. The dynamical experiments revealed that the present modeled imbalance is much lower than the observed rate of change. (Auth. mod.)

F-54248

Hatanaka, M., Ohta, Y., Nishitsuji, A., Sakaguchi, T., Wada, M., **Method of measuring snow particle size from video images for meteorological radar observations,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.110-117, 13 refs.

For meteorological radar observations, it is very important to know the size and the characteristics of precipitation particles. In this paper, the authors report a method to measure snow particle size using snow particle video images. An image of snow particles, which was recorded by a specially designed portable video camera set on the ground, was digitized by a personal computer. To reduce background offset, the authors used subtraction processing between images at different recording times. Using projection data on this image, the position of each snow particle was detected. Finally, they measured the three kinds of snow particle "radius", applying this method to two sets of VCR tapes that had been recorded at Showa Station, on Apr. 5-6 and on Oct. 1, 1988, and obtained relative distributions. (Auth.)

F-54249

Yamanouchi, T., Ørbæk, J.B., **Comparative study of the surface radiation budget at Ny-Ålesund, Svalbard and Syowa Station, Antarctica, 1987,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.118-132, 14 refs.

The surface radiation budget in 1987 at Ny-Ålesund, Svalbard was measured by the Norwegian Polar Institute, and is discussed as a typical radiative regime for the Arctic, at the edge of the seasonal sea ice area. Compared to the observations on the sea ice at Showa Station, the net total radiation at Ny-Ålesund is much larger in the summer months than at Showa. These are the results of lower albedo in summer months and larger incident radiation due to warmer temperatures and clouds. As a whole, the radiation budget at Ny-Ålesund in summer is controlled by the maritime airmass, while in winter it is strongly affected by both maritime air from the south and arctic air from the north. (Auth. mod.)

F-54257

Jaña Obregón, R., Jeffries, M.O., **Winter investigations in the Ross, Amundsen and Bellingshausen seas, 1993-1995** [Investigación invernal en los mares de Ross, Amundsen y Bellingshausen: temporadas 1993-1994-1995], *Boletín Antártico Chileno,* Nov. 1995, 14(2), p.6-8, In Spanish with English summary. 10 refs.

Since 1993, at the invitation of the U.S. National Science Foundation, Office of Polar Programs, and the University of Alaska, INACH scientists have participated in cruises aboard the R/V *Nathaniel B. Palmer.* The three cruises encompassed the Ross, Amundsen and Bellingshausen seas. In Sep. and Oct. 1994 and Aug. and Sep. 1995, the UAF sea ice research program was carried out including observations and measurements of snow cover properties and characteristics, ice crystal structure and growth processes, ice salinity and temperature and the snow and ice thickness distribution. Other research activities during the same cruises included sea ice biology, light transmission through sea ice, physical and chemical oceanography, atmospheric science, and further documentation of the occurrence of marine mammals and sea birds. (Auth. mod.)

F-54272

Keys, H.J.R., Jacobs, S.S., Brigham, L.W., **Evolving front of the Ross Ice Shelf,** *Antarctic journal of the United States,* 1994, 29(5), p.125-126, 5 refs.

In Feb. and Mar. of 1994, the authors measured the position and height of several west antarctic ice sheet fronts, using radar ranging and a sextant from the USCGC *Polar Sea* and the R/V *Nathaniel B. Palmer.* The fronts of the Getz Ice Shelf and other features displayed a wide variety of changes from previously mapped locations but no consistent overall trend. During the last few decades some of the records have become accurate and frequent enough for estimates of short-term temporal changes in the ice fronts. Here, the authors focus upon the Ross Ice Shelf edge which has continued its northward advance. At its western extremity, the ice front is now north of Cape Bird on Ross I., substantially beyond any position recorded in the last 150 years. The maximum advance rate calculated, 1.6 km/y northward relative to a 1987 position, is larger than that estimated for the 1962-1985 interval, and occurred at the northeast headland of a new feature referred to as "Polar Sea Bay."

F-54298

Davis, C.H., **Comparison of ice-sheet satellite altimeter retracking algorithms,** *IEEE transactions on geoscience and* *remote sensing,* Jan. 1996, 34(1), p.229-236, 18 refs.

The NASA and European Space Agency (ESA) retracking algorithms are compared with an algorithm based upon a combined surface and volume (S/V) scattering model. First, the S/V, NASA, and ESA algorithms were used to retrack over 1.3 million altimeter return waveforms from the Greenland and antarctic ice sheets. The surface elevations from the S/V algorithm were compared with the elevations produced by the NASA and ESA algorithms to determine the relative accuracy of these algorithms when subsurface volume scattering occurs. By analyzing several thousand satellite crossover points from the Greenland and antarctic ice sheets, the repeatability of the surface elevations derived from the different retracking algorithms was estimated. Since previous ice-sheet growth estimates have been based upon the elevations produced by the NASA retracking algorithm, further work needs to be conducted to determine if the ESA$_{25\%}$ or S/V retracking algorithms produce growth estimates that are significantly different from the previous estimates. (Auth. mod.)

F-54305

Yung, Y.L., Lee, T., Wang, C.H., Shieh, Y.T., **Dust: a diagnostic of the hydrologic cycle during the last glacial maximum,** *Science,* Feb. 16, 1996, 271(5251), p.962-963, 30 refs.

Dust concentrations in ice of the last glacial maximum (LGM) are high in ice cores from Greenland and Antarctica. The magnitude of the enhancements can be explained if the strength of the hydrologic cycle during the LGM was about half of that at present. This notion is consistent with a large decrease (5°C) in ocean temperature during the LGM, as recently deduced from measurements of strontium and calcium in corals. (Auth.)

F-54339

Frezzotti, M., **Dynamics of David Glacier and its floating Drygalski Ice Tongue** [La dinamica del ghiacciaio di sbocco David e della sua lingua galleggiante Drygalski (Terra Vittoria, Antartide)], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.247-259, In Italian with English summary. Refs. p.256-258.

DLC G17.S69

David Glacier is the largest outlet glacier of northern Victoria Land, which drains a part of the East Antarctic Ice Sheet (224,000 km^2). The glacier terminates in Terra Nova Bay, forming an ice tongue called Drygalski, measuring about 92 km in length in 1990. The analysis of historical documents (maps, sketches and data), aerial photographs (TMA) and of satellite images (Landsat MSS and TM) allows an evaluation of ice cliff variation of the Drygalski Ice Tongue during the 20th century. The evolution is characterized by a steady increase of the ice tongue length from 1902 to 1990. Between Dec. 1956 and Dec. 1957 the most important iceberg calving of this century occurred, with a reduction of the Drygalski Ice Tongue by some 40%, from about 110 km to about 68 km. Analysis and comparison of different satellite images, taken at intervals of several years, has allowed the assessment of the variation in size, the velocities and the spreading of David Glacier and Drygalski Ice Tongue. (Auth. mod.)

F-54347

Zeebe, R.E., Eicken, H., Robinson, D.H., Wolf-Gladrow, D., Dieckmann, G.S., **Modeling the heating and melting of sea ice through light absorption by microalgae,** *Journal of geophysical research,* Jan. 15, 1996, 101(C1), p.1163-1181, 52 refs.

To investigate the effects of microalgae on the thermal regime of sea ice, a time-dependent, one-dimensional thermodynamic model of sea ice was coupled to a bio-optical model. A spectral one-stream model was employed to determine spectral attenuation by snow, sea ice, and microalgae. Energy absorption was obtained by calculating the divergence of irradiance in every layer of the model (Δz = 1 cm). Changes in sea ice temperature profiles were calculated by solving the heat conduction equation with a finite difference scheme. Model results indicate that when algal biomass is concentrated at the bottom of congelation ice, melting of ice resulting from the additional conversion of solar radiation into heat may effectively destroy the algal habitat, thereby releasing algal biomass into the water column. An algal layer located in the top of the ice sheet induced a significant increase in sea ice temperature for snow depths less than 5 cm and algal standing stocks higher than 150 mg chl a/m^2. Furthermore, under these conditions, brine volume increased by 21% from 181 to 219 parts per thousand, which decreased the physical strength of the ice. Examples are cited for McMurdo Sound and the Weddell Sea. (Auth. mod.)

F-54357

Rakusa-Suszczewski, S., **Ecosystem of the sea ice in Antarctica** [Ekosystem lodu morskiego w Antarktyce], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.54-58, In Polish. 6 refs.

DLC G578.S955 1989

In Dec. 1988 and Jan. 1989 the R/V *Professor Siedlecki* sailed to the sea ice zone between Elephant I. and the South Orkney Is. The hydrochemical characteristics of the water masses were confirmed in the study area. A high degree of diversification of bacteria in the water and in the ice, as well as high diversification in free amino acids, were found. The populations of phytoplankton and zooplankton were analyzed. A study of *Euphausia superba* showed 3 areas which were distinguished by structure and size. The krill close to the ice pack was smaller; the largest concentrations of the very large krill were confined to the west of Elephant I. (Auth. mod.)

F-54378

Harangozo, S.A., **Interannual atmospheric circulation-sea ice extent relationships in the southern ocean: an analysis for the west Antarctic Peninsula region,** Conference on Climate Variations, 6th, Nashville, TN, Jan. 1994. Preprints, Boston, American Meteorological Society, 1994, p.364-367, 7 refs.

A systematic analysis has been undertaken to determine sea ice extent-meridional circulation links in the vicinity of the western Antarctic Peninsula. Ice extent anomalies in this area generally develop over a month or two and then often persist over periods of up to several seasons. A relationship between winter season ice extent changes and the meridional component of the geostrophic flow is evident but account needs to be taken of flow persistence as well as magnitude. Meridional circulation adjustments reflect amplitude/phase adjustments of the semi-annual cycle; the present work supports the notion that interannual changes in winter sea ice extent in the study area may in many cases ultimately depend on regional or even large-scale adjustments in the southern hemispheric circulation.

F-54412

Conrad, C.P., Hager, B.H., **Elastic response of the earth to interannual variations in antarctic precipitation,** *Geophysical research letters,* Dec. 1, 1995, 22(23), p.3183-3186, 13 refs.

Measurements of elastic displacements of the bedrock surrounding large ice sheets have been proposed as a means to detect mass changes in these ice sheets. However, accumulation of glacial mass on the ice sheets is subject to large spatial and temporal variations in precipitation. The authors simulated the response of the antarctic continent to a stochastic model of interannual precipitation variations, and show that interannual variations in the elastic response of the earth are large compared to the long-term mean of displacements produced by an assumed average ice mass imbalance of 10%. If, as some scientists predict, antarctic ice mass changes in the future become dramatic, the long-term signal should be large enough to be detected by a few years of geodetic measurements, despite climatic noise. (Auth. mod.)

F-54420

Lytle, V.I., Jezek, K.C., Gogineni, S.P., Hosseinmostafa, A.R., **Field observations of microwave backscatter from Weddell Sea ice,** *International journal of remote sensing,* Jan. 10, 1996, 17(1), p.167-180, 22 refs.

Microwave backscatter experiments from Weddell Sea ice are described. The objectives of these measurements were to document microwave signatures of antarctic ice morphologies and to determine the geophysical processes responsible for microwave scattering. The frequency of 13.5 GHz is similar to that used on operational satellite radar altimeters. Two characteristics of the snow cover dominated the measured backscatter coefficients (σ^0). A thick snow cover increased σ^0 at oblique incidence due to volume scatter. Slush at the snow/ice interface increased σ^0 by about 8 dB at normal incidence because the smooth surface of the slush layer represents a stronger dielectric boundary. These results indicate that it may be possible to monitor the formation and subsequent freezeup of this slush layer using satellite radars. Field observations have shown that slush can be a significant source of new ice formation, contributing as much as 16% to the total sea ice volume found in the Weddell Sea. (Auth. mod.)

F-54457

Kellogg, D.E., Kellogg, T.B., **Diatoms in South Pole ice: implications for eolian contamination of Sirius Group deposits,** *Geology,* Feb. 1996, 24(2), p.115-118, 38 refs.

Marine and nonmarine diatoms occur throughout a South Pole ice core spanning the past 2000 yr. Similar diatoms occur in East and West Antarctica at Siple and Taylor domes. Because there are no local diatom sources at these locations, diatoms must have been carried by winds from coastal or extra-antarctic sites. These data demonstrate widespread historical eolian transport of diatoms to the antarctic ice sheets, supporting the view that Sirius Group sediments were contaminated by late Neogene diatoms long after they were deposited. If so, there is no reason to postulate a Pliocene deglaciation event in East Antarctica. (Auth. mod.)

F-54462

Pathak, R.C., **Comparative study of antarctic, arctic and Himalayan ice,** *Defence science journal,* July 1989, 39(3), p.269-276, 11 refs.

DLC U395.I5D4

Ice samples obtained at arctic and antarctic latitudes have dissimilar properties. Even the salient properties of snow and ice in the western and central Himalayas vary due to differing free water contents. A study has been carried out on ice and snow data in these areas and their stratigraphic and metamorphic characteristics have been compared. In the present paper, an analysis of these properties is presented.

F-54479

Drewry, D., **Ice sheets, climate change and sea level,** *Physics world,* Jan. 1996, 9(1), p.29-33, 5 refs.

This paper discusses the potential influence of global warming on the ablation of ice sheets in Antarctica and Greenland, emphasizing the role of glacial meltwater in elevating sea level.

F-54483

Xie, S.M., Bao, C.G., Hao, C.J., **Interaction between sea ice of the Antarctic and Arctic,** *Chinese science bulletin,* Oct. 1995, 40(20), p.1713-1718, 7 refs.

Sea ice of the Antarctic and Arctic comprises two huge heat sinks of a global atmosphere-ocean thermal engine which has a significant effect on global atmospheric circulation and climate. Most prior studies on sea ice of the two polar regions and their relationships to atmospheric circulation have been limited to sea ice variations at polar latitudes and their effects on climate. This note takes a comprehensive research view of the ice on a global scale, seeking to learn the impact each has on the other and on the global climate changes. SIGRID sea ice data provided by the Navy-NOAA Joint Ice Center (JIC) are used to calculate monthly mean net sea ice area indexes and their anomaly values of the antarctic sea ice in 1973-1989 and the arctic sea ice in 1972-1989.

F-54487

Etheridge, D.M., Steele, L.P., Langenfelds, R.L., Francey, R.J., Barnola, J.M., Morgan, V.I., **Natural and anthropogenic changes in atmospheric CO_2 over the last 1000 years from air in antarctic ice and firn,** *Journal of geophysical research,* Feb. 20, 1996, 101(D2), p.4115-4128, 61 refs.

A record of atmospheric CO_2 mixing ratios from 1006 to 1978 A.D. has been produced by analyzing the air enclosed in three ice cores from Law Dome. The enclosed air has unparalleled age resolution and extends into recent decades, because of the high rate of snow accumulation at the ice core sites. The CO_2 data overlap with the record from direct atmospheric measurements for up to 20 years. The effects of diffusion in the firn on the CO_2 mixing ratio and age of the ice core air were determined by analyzing air sampled from the surface down to the bubble close-off depth. The uncertainty of the ice core CO_2 mixing ratios is 1.2 ppm (1 σ). Major CO_2 growth occurred over the industrial period except during 1935-1945 when CO_2 mixing ratios stabilized or decreased slightly, probably as a result of natural variations of the carbon cycle on a decadal time scale. (Auth. mod.)

F-54489

Kamiyama, K., Motoyama, H., Fujii, Y., Watanabe, O., **Distribution of hydrogen peroxide in surface snow over antarctic ice sheet,** *Atmospheric environment,* Mar. 1996, 30(6), p.967-972, 10 refs.

The concentration of hydrogen peroxide (H_2O_2) in surface snow samples obtained in East Queen Maud Land from summer 1991 to late summer 1993 is discussed. Surface snow samples were obtained in various locations and seasons during five traverses with snow vehicles. Gradual distributions were observed, depending upon the season and the location. The concentration of H_2O_2 is higher in summer than in winter, and is also higher in the inland region at higher altitude than in the coastal region at lower altitude. A sudden increase in early summer snow was observed, suggesting the sudden change in atmospheric environments affecting the concentration of H_2O_2 in the snow. (Auth. mod.)

F-54492

Fahnestock, M., **Ice shelf breakup,** *Science,* Feb. 9, 1996, 271(5250), p.775-776, 8 refs.

Commenting on the recent breakup of several ice shelves on the Antarctic Peninsula, the author provides a perspective on these events and "amplifies some of the possible implications for understanding the origin and dynamics of the larger ice shelves".

F-54498

Kaminuma, K., **Lake Vostok beneath the antarctic ice sheet—a Russian research proposal,** *Polar news,* Mar. 1995, No.60, p.36-40, In Japanese.

A large subglacial lake, tentatively named Lake Vostok, has been detected beneath the ice sheet at Vostok Station by seismic and radar altimetry soundings. The lake is oval shaped, about 250 km long by 40 km wide with an area of about 10,000 km^2 and a depth of 400 m. The ice sheet at Vostok Station has a surface elevation of about 3500 m and a thickness of 3800 m. The interface of the bottom surface of the ice sheet and top surface of the subglacial lake is therefore 300 m below sea level and the bottom of the lake is 700 m below sea level. An ice core drilling project at Vostok was suspended in 1994 at a depth of 2700 m, 1100 m above the lake, due to lack of supplies. Two Russian scientists, A.P. Kapitsa, the first to report the existence of the lake, and I.A. Zotikov, who has been an exchange scientist to Japan, have urged the resumption of the ice core drilling so that eventually the lake water can be sampled to determine if the lake was formed by pressure melting or by geothermal melting under the ice sheet, and if there is any life in the lake.

F-54512

Skvarca, P., García, M.J., **Drift of the tabular iceberg Filchner 1986A** [Deriva del témpano tabular Filchner 1986A], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.105-109, In Spanish. 7 refs.

DLC G845.5.J67

Low and high resolution NOAA and METEOR images, recorded between Aug. 28 and Oct. 14, 1991 and used in the study of the drifting trajectory of an antarctic tabular iceberg, are discussed and illustrated.

F-54517

Giovinetto, M.B., Compagnucci, R.H., **Sea-ice extent and net mass accumulation at the surface in the sectors of the Amundsen, Bellingshausen, and Weddell seas, Antarctica,** Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.129-141, 17 refs.

DLC G845.5.J67

Sea-ice extent and net mass accumulation at the surface of ice sheets are important elements in climatic modeling. In this study, the authors use the outer boundary of sea-ice concentrations of 15% and 20% to define "open ocean" as a source of atmospheric moisture, and analyze the relationship between distance to open ocean and the rate of accumulation for grid-point locations in the antarctic sectors of Amundsen, Bellingshusen, and Weddell seas. The area of the Antarctic Peninsula north of 70°S is excluded from this study; in this region of complex topography and air drainage pattem the areal distribution of the accumulation rate is not suitable for interpolation as required in grid sampling. (Auth. mod.)

F-54561

Raymo, M.E., Horowitz, M., **Organic carbon paleo-pCO_2 and marine-ice core correlations and chronology,** *Geophysical research letters,* Feb. 15, 1996, 23(4), p.367-370, 30 refs.

The authors present evidence that marine organic matter $\delta^{13}C$ measurements can closely reproduce the Vostok ice core CO_2 record and, in addition, can be used to evaluate the absolute Vostok chronology and the transfer of that chronology between the marine and terrestrial realms. The data support recent speculations that the base of the Vostok ice core (2755 m) is still within oxygen isotope stage 7, in agreement with recent orbitally-tuned ice core chronologies. (Auth. mod.)

F-54565

Wang, D.D., Dai, C.D., **Study on cosmic dust particles in antarctic ice, snow and non-antarctic region and their origins,** *Antarctic research,* Dec. 1995, 6(2), p.1-17, Refs. p.16-17. For Chinese original see 49-3148 or 23F-52281.

A large number of cosmic dust particles, micrometeorites and volcanic dust bands have been found and collected in antarctic ice, snow and glacial sediments, especially in meteorite-concentrated regions. Extraterrestrial spherules also have been discovered from the stratosphere and deep-sea sediments. On the basis of distributive characteristics, cosmic dust particles are classified into interplanetary dust particles and interstellar dust particles. Cosmic dust particles can be divided into cometary origin, asteroidal origin, ablation from meteorites and interstellar origin. The criteria for identifying cosmic dust particles have been established, and the origin of cosmic dust particles is discussed. (Auth.)

F-54570

Han, J.K., Jin, H.J., Wen, J.H., Shang, X.C., **Temperature distribution of Collins Ice Cap, King George Island, Antarctica,** *Antarctic research,* Dec. 1995, 6(2), p.57-65, 7 refs. For Chinese original see 49-5457 or 23F-53097.

Borehole temperature measurements show that Collins Ice Cap has characteristics of a temperate glacier in most parts of the accumulation area, but is characterized as a cold glacier in the ablation area. The ice temperature of the active layer is noticeably affected by seasonal variations in air temperature. The water infiltrating and warming is very significant at a depth of 30 m; the snow cover also has an effect on temperature distribution. The data reveal that the ice temperature in deep layers is at the freezing point: the temperature varies widely in the vicinity (10-20 m) of Little Dome. (Auth. mod.)

F-54578

Li, S.K., **Research on the glaciation of the Larsemann Hills, East Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(4), p.7-16, In Chinese with English summary. 29 refs.

The Larsemann Hills are ice free and cover an area of approximately 200 km^2 on the Ingrid Christensen Coast. The hills had been covered by ice as early as Early Oligocene, and the ice sheet was thickest in the Late Oligocene. Since the Miocene the ice sheet has begun to retreat and decrease in thickness. The glaciation scale of the Quatemary is far inferior to the Tertiary. The thickness of the ice sheet exceeds 170 m and the margin thickens about 30 km at 18 ka. The time of deglaciation and exposed rocky land has been estimated at 10 ka. The islets of the Larsemann Hills were ice free by 6.5 ka, and the rate of retreat was 2-3 m/a. By 5.0 ka, 50% of the hills were exposed and ice was retreating at 1.0-1.5 m/a. After 5.0 ka the rate of retreat did not exceed 0.8-1.0 m/a up to its present position. (Auth. mod.)

F-54645

Minale, M., Astarita, G., **Ice streams in Antarctica: transverse instability of gravity driven flow,** *Journal of non-Newtonian fluid mechanics,* Feb. 1996, 62(2-3), p.155-174, 37 refs.

The authors analyze the gravity driven flow of ice down the slopes of Antarctica. Ice streams are almost invariably observed, and these could be explained by a transverse instability of the gravity driven flow of ice. In Newtonian fluids, the longitudinal instability is guaranteed to be the predominant one, hence any transverse instability must be due to the non-Newtonian character of ice. The authors show that the second-order Coleman-Noll fluid and the lower-convected Maxwell fluid could indeed show a predominant instability in the transverse direction, and they advance two speculations: first, that the predominant instability is either the longitudinal or the transverse one, and second, that the latter may be the case only for fluids which exhibit a non-zero second normal stress difference in shear flow. (Auth. mod.)

F-54646

Freyer, H.D., Kobel, K., Delmas, R.J., Kley, D., Legrand, M.R., **First results of $^{15}N/^{14}N$ ratios in nitrate from alpine and polar ice cores,** *Tellus,* Feb. 1996, 48B(1), p.93-105, 48 refs.

Isotopic analyses of nitrogen were performed in nitrate from alpine and polar snow and ice. Nitrate from recent alpine ice cores showed similar $^{15}N/^{14}N$ ratios and seasonal variations as continental rain nitrate. Nitrate from recent Summit (Greenland) precipitation also showed similar isotope composition to European rain but, in ice cores, increasing $^{15}N/^{14}N$ ratios with decreasing nitrate concentrations are observed as a function of depth until about the year 1950, which is when anthropogenic emissions of nitrogen oxides started to increase rapidly in the Northern Hemisphere. In recent antarctic ice from the South Pole, nitrate concentrations are nearly the same as in the measured Greenland ice up to the year 1967, where the record for South Pole ice stops. No conclusions on recent nitrate pollution in the Antarctic could be made from this poorly documented core. Measured isotopic ratios for the Greenland ice core for the preanthropogenic period correspond to one antarctic ice core (D47); both cores show similar snow accumulation rates. Isotopic ratios for other antarctic ice cores are different from the Greenland ratio; a clear relationship is found between the isotopic composition and the snow accumulation rate, with heavier ratios observed with decreasing accumulation rates. (Auth. mod.)

F-54653

Bondesan, A., Capra, A., Gubellini, A., Tison, J.L., **On the use of static GPS measurements to record the tidal responses of a small antarctic ice shelf (Hells Gate Ice Shelf, Victoria Land),** *Geografia fisica e dinamica quaternaria,* 1994, 17(2), p.123-129, With Italian summary. Refs. p.129.

Recent developments of GPS (Global Positioning System) technology provide a new powerful tool to study ice shelf-ocean dynamic interactions. Here the authors present results from feasibility tests on the use of static GPS measurements to locate grounding zones and study their impact on the ice shelf mechanical response. The Hells Gate ice shelf has been studied owing to its closeness to Terra Nova Bay Station and to the peculiar problems it raises for glaciologists and geophysicsts. Technical and analytical problems are discussed and 5 short time lapse records from various places of the ice shelf surface are interpreted. Most of the survey stations appear to react fully hydrostatically to the tidal forcing, even during a secondary maximum of only a few cm amplitude. The most upstream station (4), located in a strait between Vegetation I. and the Northern Foothills, shows a departure from hydrostatic equilibrium in accordance with a scheme of bedrock valley side effects. (Auth. mod.)

F-54713

Fountain, A.G., Vaughn, B.H., Dana, G.L., **McMurdo LTER: Glacier mass balances of Taylor Valley, Antarctica,** *Antarctic* *journal of the United States,* 1994, 29(5), p.226-228, 6 refs.

In the 1993-1994 season, ablation stake networks were established on three glaciers: Commonwealth, Canada, and Howard. The ablation of the terminus cliff of Canada and Howard Glaciers, neglecting losses from calving events, is 5-10 times greater than on the top surface of these glaciers. Ablation from the glacier fan of Howard Glacier was almost twice that of either Commonwealth or Canada Glaciers. It is suggested that the cause of this difference is the sunlight-shading pattems in the valley. The mass balance of both Commonwealth and Howard Glaciers was negative during the Nov. to Jan. 1993-1994 summer season. To estimate the magnitude and frequencey of calving events from the glacier terminus, automatic cameras were positioned in front of the Commonwealth and Howard Glaciers. Preliminary analysis of the photographs indicates that calving is infrequent. From late Oct. to the end of Jan., no calving events were detected at Commonwealth Glacier, and one event was detected at Howard Glacier.

F-54745

Simões, J.C., **Partial disintegration of antarctic ice** [Desintegração de parte do gelo antártico], *Informativo CIRM,* Jan./June 1995, 7(1), p.3-4, In Portuguese.

An account is given of phenomena of ice disintegration beginning on Jan. 22, 1994, at approximately 300 km south of the Comandante Ferraz Station, and resulting in thousands of ice fragments, some 200-300 m thick. By Mar. 22nd, the fragments had formed into normal-sized icebergs floating in the Weddell Sea. Some of the consequences, such as the re-distribution of the sea ice affecting various stations in the area, are described.

F-54811

Tsang, L., Davis, D.T., West, R.D., Chen, Z.X., Hwang, J.N., Winebrenner, D.P., **Passive microwave remote sensing of snow: volume scattering in snow and parametric inversion of snow parameters with an artificial neural network,** ESA/NASA International Workshop, Saint Lary, France, Jan. 11-15, 1993. Passive microwave remote sensing of land-atmosphere interactions. Edited by B.J. Choudhury, Y.H. Kerr, E.G. Njoku, and P. Pampaloni, Zeist, Netherlands, VSP BV, 1995, p.295-314, 31 refs.

Passive microwave remote sensing of snow is affected by volume scattering which can be a result of layering or scattering by ice grains. Because of the smallness of ice grains, layering plays a dominant role at low microwave frequencies. The brightness temperature of antarctic fim at C-band with a centimeter layering model is studied. Comparisons are made with ground-based experimental data using ground truth determined density layering profiles. Scattering by ice grains in snow is important at frequencies above 18 GHz. The authors study the volume scattering effects with the dense media radiative transfer theory. The inversion of snow parameters from passive microwave remote sensing measurements using a neural network trained with a dense media multiple scattering model is also performed. Inversion of five parameters is simultaneously performed from five brightness temperatures. The five parameters are: mean-grain size of ice particles in snow, snow density, snow temperature, snow depth, and the real part of the ground permittivity. A constrained iterative scheme is used with error analysis illustration. The neural network constrained iterative inversion algorithm is also illustrated by performing synthetic mapping of a terrain where all five parameters are simultaneously inverted. The reconstructed contours are in good agreement with the original ones. (Auth. mod.)

F-54823

Kiernan, V., **South Pole wanders from the straight and narrow,** *New scientist,* Feb. 10, 1996, 149(2016), p.10.

An explanation is given as to why the "true" south geographic pole markers had to be offset for 1995 and 1996: in 1995 and 1996 the south pole site was located by the Global Positioning System, a more accurate method than earlier measuring systems, which found the markers for those years somewhat out of alignment with the others. The ceremonial South Pole site remains as it was.

F-54833

Wendler, G., Quakenbush, T., **Ultraviolet radiation in the southern seas in early spring 1993,** *Antarctic journal of the United States,* 1994, 29(5), p.254-256, 2 refs.

The National Science Foundation research vessel *Nathaniel B. Palmer* carried out a cruise to Antarctica in early spring of 1993. It left Punta Arenas on Aug. 11, 1993, sailed south for 3 days to the tip of the Antarctic Peninsula, stopping at O'Higgins and Palmer Stations, and from there went southwest and into the Bellingshausen Sea. On Sep. 10, it reached the most southerly position, 71°S, some distance north of the Thurston I. The main purpose of the cruise was to investigate the snow- and sea-ice thickness, properties, and structures in this part of the southem ocean and carry out continuous radiation measurements. The radiative levels changed substantially during the trip, as both latitude and season changed. The mean value of the cleamess index K_t (total transmissivity) was found to be 0.44. This is a low value, but the cloudiness was high (mean value 78%); the ultraviolet-A and ultraviolet-B radiation were related to the global radiation. Correlation coefficients increased substantially when the relationship was investigated for different cloudiness classes; the ozone concentration during the trip varied between 160 to 290 DU (Dobson units); and the ultraviolet-B radiation more than dobuled when the ship entered the "antarctic ozone hole," whereas the ultraviolet-A radiation was hardly affected.

F-54890

Hodge, S.M., Doppelhammer, S.K., **Satellite imagery of the onset of streaming flow of ice streams C and D, West Antarctica,** *Journal of geophysical research,* Mar. 15, 1996, 101(C3), p.6669-6677, 18 refs.

Five overlapping Landsat multispectral scanner satellite images of the interior of the West Antarctic ice sheet were enhanced with principal component analysis, high-pass filtering, and linear contrast stretching and merged into a mosaic by aligning surface features in the overlap areas. The mosaic was registered to geodetic coordinates, to an accuracy of about 1 km, using the five scene centers as control points. The onset of streaming flow of two tributaries of ice stream C and one tributary of ice stream D are visible in the mosaic. The onset appears to occur within a relatively short distance, less than the width of the ice stream, typically at a subglacial topographic feature such as a step or ridge. The ice streams extend farther up into the interior than previously mapped. The grounded portion of the West Antarctic ice sheet is perhaps best conceptualized as an ice sheet in which ice streams are embedded over most of its area, with slowly moving ice converging into fast moving ice streams in a widely distributed pattem, much like that of streams and rivers in a hydrologic basin. (Auth. mod.)

F-54907

Isaksson, E., Karlén, W., Gundestrup, N., Mayewski, P.A., Whitlow, S.I., Twickler, M.S., **Century of accumulation and temperature changes in Dronning Maud Land, Antarctica,** *Journal of geophysical research,* Mar. 20, 1996, 101(D3), p.7085-7094, 43 refs.

A mass balance program was initiated in the Vestfjella-Heimefrontfjella area of westem Queen Maud Land during the austral summer of 1988-1989. As a part of this program, spatial and temporal variations in snow accumulation and temperature/stable isotopes are measured using shallow fim cores. This paper presents surface accumulation data and discusses the climatic implications of the stable isotope records from two shallow fim cores. One 30 m-deep core, obtained about 200 km from the coast at 700 m asl, covers the period 1932-1991. The other core was drilled at about 500 km from the coast at 2900 m asl and covers the period 1865-1991. The recent accumulation increase reported from several areas of the antarctic continent is not present in either of these records. Instead, this coastal record suggests a significant decrease in accumulation, with the strongest trend from about 1975. There is a positive trend in the oxygen isotope signal in both cores, which in the coastal core corresponds to a temperature increase of about 1.8°C since 1865. However, it is likely that part of this increase in $\delta^{18}O$ is due to a change of moisture source. (Auth. mod.)

F-54909

Jacobel, R.W., Scambos, T.A., Raymond, C.F., Gades, A.M., **Changes in the configuration of ice stream flow from the West Antarctic ice sheet,** *Journal of geophysical research,* Mar. 10, 1996, 101(B3), p.5499-5504, 18 refs.

Surface-based ice-penetrating radar profiles on the northeast flank of Siple Dome support the hypothesis that a curvilinear scar first observed in advanced very high resolution radiometer satellite imagery represents the margin of a formerly active ice stream. The scar defines the southwestern boundary of an ice stream flowing from ice stream C to ice stream D, close to where it enters the Ross Ice Shelf. These studies show that the scar coincides with a trough and upward step in surface topography approximately 5 km across, underlain by a zone of disturbed internal stratigraphy revealed by the radar. Burial depth of the disturbed zone permits the calculation of the time of shutdown as occurring prior to approximately 1.3 ka. The configuration of the ice streams draining the West Antarctic ice sheet into the Ross Ice Shelf evidently changes with time, and any attempt to predict the evolution of the ice sheet must incorporate this observation. (Auth. mod.)

F-54916

Shinohara, M., Ishimaru, S., Harada, K., **Albedo on snow surface in Patriot Hills, Antarctica,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.65-69, 1 ref.

The purpose of this paper is to make clear the surface albedo in summer in Antarctica and its dependence on cloud amount, solar elevation and microtopography of the snow surface (sastrugi). The solar radiation and reflected solar radiation were measured at Patriot Hills from Nov. 1992 to Jan. 1993. For this period, cloud amount and the direction of the axis of sastrugi were observed. Mean albedo for this period was 77.1%. The albedo increased with decreasing solar radiation, so the values on cloudy days were higher than on clear days. Effects of sastrugi on albedo were not evident.

F-54917

Harada, K., **Observation of snow crystals in Antarctica and Greenland,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.71-76, 2 refs.

Snow crystals were collected in Antarctica and Greenland and their surface structures were analyzed. The snow crystals at Patriot Hills Camp were mainly columns; the types of crystal changed from plates to other types in one snowfall event. On the inland part of the antarctic ice sheet, columns were a major type of snow crystals as well. In Greenland, differing from Antarctica, dendritic crystals, hexagonal plates, needles and "tsuzumi" were observed. (Auth.)

F-54918

Yoshikawa, K., **Surface feature of antarctic ice sheet between 80° and 90°S along the longitude 90°W,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.77-86, 3 refs.

Antarctic ice sheet surface features were observed and explored. The study area was divided into katabatic wind and plateau zones. Surface features were generally classified into four categories: wind erosional, wind depositional, thermal action, and geophysical action forms. (Auth.)

F-54919

Harada, K., Yoshikawa, K., Ishimaru, S., **Study on variation of hardness of snow in Patriot Hills Camp, Antarctica,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.87-94, 4 refs.

Observations of hardness of snow surface and weather conditions were carried out at Patriot Hills Camp from Dec. 1992 to Jan. 1993. The snow hardnesses of sastrugi and wave-shaped surface points were measured; the values range from 1,800 to 4,400 g/cm^2 at sastrugi, and from 1,000 to 7,000 g/cm^2 at the wave-shaped sites. The duration of the observation is divided into six periods; variations of hardness are discussed. During clear and light-wind days, hardness values increased gradually. During snow drifts, the hardness depended on the snow accumulation rates. (Auth.)

F-54920

Watanabe, O., Kanamori, S., Kanamori, N., Kamiyama, K., **On the chemical compositions of freshly fallen and drifting snow samples obtained between the Ronne Ice Shelf and the South Pole,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.95-105, 4 refs.

From Nov. 1992 to Jan. 1993, 27 freshly fallen snow samples were obtained during a traverse from Patriot Hills to the South Pole; the distance between the two points is 1,080 km. During the same period, 20 snow samples were obtained at Patriot Hills every time there was a snowfall. These samples were analyzed for $\delta^{18}O$, Cl^-, NO_3^-, SO_4^-, methane sulphonate (MSA), Na^+, K^+ and NH_4^+ (by ion chromatography). The results and their significance are reported here. Chemical analyses of snow samples over a wide area were also conducted on the Mizuho Plateau by the 29th Japanese Antarctic Research Expedition in Nov.-Dec. 1988. In the present report, the results of these two observations are compared to obtain information about the transport of substances through the atmosphere over the interior of the continent.

F-54921

Osada, K., Matsunaga, K., Mori, I., Iwasaka, Y., Yoshikawa, K., **Ionic constituents in surface snow samples obtained by Antarctic Walk Expedition, Summer 1992/93,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.109-119, 20 refs.

Surface snows were sampled daily by a traverse team of the Japanese Antarctic Walk Expedition from Patriot Hills to South Pole (ca. 1080 km) between Nov. 1992 and Jan. 1993. To study spatial and temporal variations in snow chemistry, surface and fallen snow samples were also taken daily at a base camp near Patriot Hills for the same period. Sea-salt components (Na^+, Cl^- and Mg^{2+}) showed constantly lower concentration levels in higher inland and southern locations. Variations of methanesulfonate (MSA) and SO_4^{2-} concentration levels showed nearly parallel profiles and similar trends to sea-salt profiles but were still variable at inland locations. A comparison between the base camp and the traverse data set suggests a unique transport process for NO_3^- in higher inland regions. (Auth.)

F-54945

Bondesan, A., Tison, J.L., Chappellaz, J., Maggi, V., **Strain net and ice flow monitoring of Hells Gate ice shelf (Terra Nova Bay, Antarctica),** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.47-48, 9 refs.

One of the aims of the research carried out at Hells Gate Ice Shelf (HGIS), in order to define the particular conditions under which the different systems of marine ice accrete and interact with continental ice, is to individualize the ice flows feeding the ice shelf, and establish their origin, velocity and stress fields. During the 1993-94 antarctic expedition, a net of some 100 aluminium and plastic stakes with red flags was installed at the HGIS surface. Only 53 out of the 83 stakes of the main net have been found. Preliminary results of a topographic survey of the stakes, carried out in order to measure velocity, strains and ablation, are discussed.

F-54946

Capra, A., Radicioni, F., **GPS geodetic activities in the 1994-95 antarctic campaign,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.49-50, 2 refs.

Geodetic activities conducted in the 1994-95 campaign included some measurements for the control of glacial dynamics and for ground control of satellite images and air photograms with the aim of map and orthophoto planes production. GPS instruments were used, including the Trimble receiver model 4000 SSE in static, rapid-static and kinematic modes. Field work conducted in the Hells Gate area is described, including details of the GPS measurements taken at 5 points of the David-Drygalski glacier.

F-54971

Shi, Y.F., Li, J.J., **Progress in glaciology and Quaternary glaciation research in China since 1978,** *Cryosphere,* 1995, Vol.1, p.3-16, Refs p.13-16. Journal of glaciology and geocryology, Vol.17, 1995, Special issue.

This paper summarizes the progress in glaciology and Quaternary glaciation research in China since 1978, including antarctic ice sheet research, ice core studies in the Tibetan Plateau, investigations on glacial lake outburst floods, debris flow and snow disasters in the Karakorum Mountains, the Himalayas etc., reconstruction of the Tianshan Glaciological Station and its main progress, glacier inventories and research on glacier meltwater resources, expeditions and a summary of regional glaciology, variations of seasonal snow distribution and meltwater, reconsiderations of the Quaternary glaciation and environment in East China, and advances in Quaternary glaciation research in West China and its disputation. (Auth.)

F-54974

Verbitskiĭ, M.IA., Saltzman, B., **Behavior of the East Antarctic ice sheet as deduced from a coupled GCM/ice-sheet model,** *Geophysical research letters,* Nov. 1, 1995, 22(21), p.2913-2916, 18 refs.

While the possible instability of the West Antarctic ice sheet has been widely recognized for some time as a potential source of sea-level rise in an enhanced greenhouse warming, the stability of the East Antarctic ice sheet has only recently become the subject of such a conjecture. This study uses a numerical experiment with an atmospheric general circulation model (GCM) coupled to a 3-dimensional ice-sheet model. Response of the ice sheet model to the external forcing generated by an atmospheric GCM due to doubling the CO_2 concentration does not show any appreciable changes in the horizontal extent of the ice sheet due to normal creep and topographic instabilities, suggesting that an antarctic collapse resulting from these factors is unlikely. The mechanics of basal sliding, non-isothermal effects, and ice shelves are as yet too poorly understood to make quantitative estimates of possible instabilities due to these processes. (Auth. mod.)

F-54995

Takahashi, A., Fujii, Y., Cho, K., Nishio, F., Furukawa, T., Watanabe, O., **Application of synthetic aperture radar (SAR) imagery on antarctic glaciology,** *Antarctic record,* Nov. 1995, 39(3), p.205-232, In Japanese with English summary. 23 refs.

Antarctic sea ice and ice sheets were studied using the ERS-1 and JERS-1 SAR images received at Showa Station in 1991-93. Analysis was mainly done for the sea ice in Lützow-Holm Bay, ice streams flowing into the bay, ice sheets near the coast and inland nunataks. Back-scattering coefficient of the SAR images differs clearly between first-year and multiyear sea ice covered with snow, which are difficult to be distinguished in the MOS-1/MESSR images. Weak scattering is confirmed in bare sea ice because of the smooth surface. (Auth. mod.)

F-55001

Lachlan-Cope, T., **Catching clouds,** *NERC news,* Apr. 1996, No.35, p.20-21.

The article explains the technology involved in catching a snowflake or a particle from a cloud in Antarctica, and bringing it back to England to study.

F-55054

Fichefet, T., Morales Maqueda, M.A., Planton, S., Bellevaux, C., **Global sea-ice—upper-ocean model: some preliminary results,** International Symposium on Sea Ice, Beijing, China, Oct. 18-22, 1993, 1993, 14p., 26 refs.

The authors propose a new coupled upper-ocean-sea-ice model suitable for climate studies. The model consists of a thermodynamic component and a dynamic component linked by advection processes. The thermodynamic part allows for sensible and latent heat storage in the ice. A parameterization of leads is also included. With regard to the dynamic part, the acceleration term in the momentum equation is neglected and the sea-ice interaction is modelled by a bulk rheology. The upper-ocean model is made of an integral mixed-layer model and a diffusive pycnocline model. At the surface, the coupled model is forced by a climatology derived from outputs of a 10-year run of the atmospheric general circulation model EMERAUDE of Météo France. The temperatures and salinities of the upper ocean are restored to the annual mean data of Levitus (1982). This allows to implicitly account for the advection of heat and salt by oceanic currents. Annual mean geostrophic currents, also obtained from Levitus (1982), are used as forcing in the sea-ice momentum balance. Results from a seasonal cycle simulation both in the Arctic and in the southern ocean are presented and compared to recent satellite and *in situ* observations. (Auth. mod.)

F-55080

West, R.D., Winebrenner, D.P., Tsang, L., Rott, H., **Microwave emission from density-stratified antarctic firn at 6 cm wavelength,** *Journal of glaciology,* 1996, 42(140), p.63-76, 22 refs.

Previous observations have shown spatial covariances between microwave emission from antarctic firn at 6 cm wavelength, physical firn temperature and firn-density stratification. Such observations motivate analysis of the physics underlying such covariances and, based on that understanding, to develop estimation methods for firn temperature and layering parameters. The authors present a model for 6 cm emission from firn in which density, and therefore dielectric permittivity, varies randomly in discrete layers with mean thicknesses on the order of centimeters. The model accounts for depth profiles of the physical temperature, mean density and variance of random density fluctuations from layer to layer. Emission-model predictions are compared with ground-based observations at four diverse sites in Antarctica which span a range of accumulation rates and other parameters. At two sites, layered-medium emission-model predictions based on the most probable input parameters (i.e. with no model tuning) agree with observations to within 3.5% for incidence angles ≤50°. Corresponding figures for the other two sites are 7.5% and 10%. However, uncertainties in the input parameters are substantial due to the limited length and depth resolution of the characterization data. (Auth. mod.)

F-55081

Raymond, C., **Shear margins in glaciers and ice sheets,** *Journal of glaciology,* 1996, 42(140), p.90-102, 20 refs.

Analytical and numerical techniques are used to examine the flow response of a sloped slab of power-law fluid (power n) subjected to basal boundary conditions that vary spatially across the flow direction, as for example near an ice-stream margin with planar basal topography. The primary assumption is that basal shear stress is proportional to the basal speed times a spatially variable slip resistance. The ratio of mean basal speed to the speed originating from shearing through the thickness, denoted as r, gives a measure of how slippery the bed is. The principal conclusion is that a localized disturbance in slip resistance affects the basal stress and speed in a zone spread over a greater width of the flow. The consequence for a shear zone above a sharp jump in slip resistance is that the shearing is spread out over a boundary layer with a width proportional to R_n. For an ice stream caused by a band of low slip resistance with a half-width of wH, the margins influence velocity and stress in the central part of the band depending on R_n in comparison to w. Three regimes can be identified, which for n=3 are quantified as follows: low r defined as $R_3<0.1w$, for which the central flow is essentially unaffected by the margins and the driving stress is supported entirely by basal drag; high r defined as $R_3>1w$, for which the boundary layers from both sides bridge across the full flow width and the driving stress in the center is supported almost entirely by side drag; intermediate r, for which the driving stress in the center is supported by a combination of basal and side drag. (Auth. mod.)

F-55082

Uratsuka, S., Nishio, F., Mae, S., **Internal and basal ice changes near the grounding line derived from radio-echo sounding,** *Journal of glaciology,* 1996, 42(140), p.103-109, 19 refs.

Evidence of changing basal and internal ice properties near the grounding line was derived from airborne radio-echo-sounder observations of the ice sheet around the Sør Rondane Mountains. From the trailing figure of the bottom-echo signal, the roughness of the ice bottom near the grounding line was inferred. Results show that the specular components of scattering begin to appear on the ice-shelf side of the grounding line. Furthermore, double-trip echoes were observed with a strong scattering in the shelf area, and their boundary of occurrence was very close to the grounding line. This is evidence of interaction between ice and sea water at the bottom of the ice shelf. In most of the area around the mountains, internal echoes were observed continuously, but they were not found at or close to the ice shelf. The boundary between the appearance and disappearance of internal-layer echoes is distinct, and occurs 20-30 km inland from the grounding line. These results suggest that some major change may occur in the internal ice on the inland side of the grounding line. (Auth. mod.)

F-55084
Higashi, A., **Ice in Tokyo and antarctic ice,** *Seppyo,* Mar. 1996, 58(2), p.169-178, In Japanese. 23 refs.

A general review is presented of studies on Tyndall figures, that is, internal melt cavities resembling six-petalled flowers in ice crystals from a pond at Nagatoro town near Chichibu in Saitama Prefecture northwest of Tokyo, and microparticles, particularly volcanic ash and cosmic dust, in ice cores from Antarctica. The Tyndall figures in the Japanese pond ice and the microparticles in the antarctic ice cores are not directly compared but it is suggested that both may be used as indicators of past and predictors of future climate change.

F-55087
Drewry, D.J., **Antarctic ice sheet,** Encyclopedia of climate and weather, Vol.1. Edited by S.H. Schneider, New York, Oxford University Press, 1996, p.39-41, 7 refs.
DLC QC854.E523

This encyclopedia entry gives a condensed description of the physical properties of the antarctic ice sheet.

F-55088
Allison, I., **Icebergs,** Encyclopedia of climate and weather, Vol.1. Edited by S.H. Schneider, New York, Oxford University Press, 1996, p.426-427, 3 refs.
DLC QC854.E523

This encyclopedia entry describes antarctic iceberg origins and fluctuations.

F-55090
Parkinson, C.L., **Sea ice,** Encyclopedia of climate and weather, Vol.2. Edited by S.H. Schneider, New York, Oxford University Press, 1996, p.669-675, 10 refs.
DLC QC854.E523

This encyclopedia entry surveys sea ice distribution and dynamics in arctic and antarctic oceans.

F-55092
Barry, R.G., **Parameterization of surface albedo for sea ice and its snow cover,** *Progress in physical geography,* Mar. 1996, 20(1), p.63-79, Refs. p.76-79.

The factors determining the albedo of sea ice and its snow cover, in both arctic and antarctic environments, including spectral characteristics, are reviewed. The thickness, properties and fractional cover of snow are of general importance. During freeze-up, ice thickness is a major determinant, as in summer is the extent and depth of melt ponds. The effects of sky conditions and surface impurities are also examined. *In situ* and remote-sensing data to validate theoretical and model results are discussed. The current parameterizations adopted in atmospheric General Circulation Models are compared and new directions described. (Auth. mod.)

F-55095
Mayewski, P.A., et al, **Climate change during the last deglaciation in Antarctica,** *Science,* June 14, 1996, 272(5268), p.1636-1638, 26 refs.

Greenland ice core records provide clear evidence of rapid changes in climate in a variety of climate indicators. In this work, rapid climate change events in the Northern and Southern hemispheres are compared on the basis of an examination of changes in atmospheric circulation developed from two ice cores. High-resolution glaciochemical series, covering the period 10,000 to 16,000 years ago from a central Greenland ice core and a new site in East Antarctica display similar variability. These findings suggest that rapid climate change events occur more frequently in Antarctica than previously demonstrated. (Auth.)

F-55107
Cooper, A.P.R., Hinton, J.C., **Correction of satellite radar altimeter data on ice-covered surfaces in Antarctica using an integrated Geographical Information System,** *International journal of remote sensing,* May 10, 1996, 17(7), p.1367-1376, 10 refs.

The problem of correcting satellite altimeter measurements for errors introduced by topographic surfaces was chosen to test the capabilities of a prototype integrated geographical information system. A system to calculate and apply corrections to altimeter data has been implemented and tested using Geosat data from the Wilkins Ice Shelf, to the west of Alexander I., West Antarctica. The method used is presented here, with particular discussion of the suitability of the GIS as a platform for performing such corrections. (Auth.)

F-55114
Stevens, J.E., **Martin's sense of ice,** *Sciences,* July-Aug. 1995, 35(4), p.14-17.

Probing the pack ice that rings Antarctica, Martin Jeffries, a glaciologist from the Geophysical Institute at the University of Alaska in Fairbanks, finds a mesmerizing dynamism and abundant evidence of life. (Auth. mod.)

F-55164
Van Roijen, J., Van Der Borg, K., De Jong, A.F.M., **Correction for *in-situ* ^{14}C in antarctic ice with ^{14}CO,** *Radiocarbon,* 1995, 37(2), International Radiocarbon Conference, 15th, Glasgow, Scotland, 15-19 Aug. 1994. Proceedings, p.165-169, 10 refs.

The authors use a dry extraction method to obtain trapped CO_2 from shallow ice cores from a blue ice area of East Antarctica. *In situ*-produced ^{14}C extracted in $^{14}CO_2$ and ^{14}CO concentrations show a mean ratio of 3.4±0.4. Correction for *in situ* $^{14}CO_2$ resulted in ice ages within 7-13 ka. The accumulation and ablation rates determined from the *in situ* production of 7-20 cm/yr and 10-13 cm/yr, respectively, agree with field measurements and thus indicate close to total efficiency of extraction.

F-55166
Wilson, A.T., **Application of AMS ^{14}C dating to ice core research,** *Radiocarbon,* 1995, 37(2), International Radiocarbon Conference, 15th, Glasgow, Scotland, 15-19 Aug. 1994. Proceedings, p.637-641, 9 refs.

The author describes the use of the accelerator mass spectrometer (AMS) sublimation technique to ^{14}C-date polar ice cores. An unexpected result of this work has been to extend the understanding of how polar ice sheets entrap and record the past composition of the Earth's atmosphere. This work has led to the discovery of a new phenomenon in which CO_2 and other greenhouse gases can be entrapped in cold (never melted) polar ice sheets. (Auth.)

F-55170
Lytle, V.I., Ackley, S.F., **Heat flux through sea ice in the western Weddell Sea: convective and conductive transfer processes,** *Journal of geophysical research,* Apr. 15, 1996, 101(C4), p.8853-8868, 27 refs.

The heat flux through the snow and sea ice cover and at the ice/ocean interface were calculated at five sites in the western Weddell Sea during autumn and early winter 1992. In late Feb., three of the five sites had a slush layer at the snow/ice interface. As this slush layer froze to form snow ice, the dense brine which was rejected flowed out through brine drainage channels and was replaced by lower-salinity, nutrient-rich seawater from the ocean upper layer. As the slush layer froze over a 2-3 week period, the convection within the ice transported salt from the ice to the upper ocean and increased total heat flux through the overlying ice and snow cover. On an area-wide basis, approximately 10 cm of snow ice growth occurred within second-year pack ice. This ice growth, near the surface of the ice, provides a salt flux to the upper ocean equivalent to 5 cm of ice growth, despite the thick (about 1 m) ice cover, in addition to the ice growth in the small (area less than 5%) open water regions. (Auth. mod.)

F-55205

Vaughan, D.G., et al, **Subglacial and seabed topography, ice thickness and water column thickness in the vicinity of Filchner-Ronne-Schelfeis, Antarctica,** *Polarforschung,* 1994 (Pub. 1995), 64(2), p.75-88, The full map of subglacial and seabed topography at a scale of 1:2,000,000 is housed in a jacket inside the back cover. 55 refs.

Presented here are thematic maps of subglacial and seabed topography, and water column thickness, over Filchner-Ronne Ice Shelf, its hinterland and the adjacent portion of the Weddell Sea. Subglacial and seabed topography were derived from various bathymetric observations, seismic and radar soundings. Ice shelf draft was deduced from an inversion of ERS-1 radar altimetry, assuming hydrostatic equilibrium. Finally, the water column thickness was calculated as the difference between the sea bed depth and the ice shelf draft. The seabed morphology beneath the ice shelf is dominated by a slope down towards the interior of the continent. Seabed depths near the ice front of around 200 to 300 m increase to more than 1500 m at the grounding line of some ice streams. Deep troughs, possibly glacially deepened, run beneath the eastern and western sides of the ice shelf and cross the continental shelf. An area of small water column thickness to the northwest of Berkner I. suggests that extensive grounding could occur after a relatively small change in the ice shelf. This might result in very significant changes to the positions of the Berkner I. summits and the rates of production of Ice Shelf Water. (Auth.)

F-55214

Wu, X.R., Simmonds, I., Budd, W.F., **Comparison of sea ice simulations with interactive and monthly averaged forcing models,** *Journal of geophysical research,* Apr. 27, 1996, 101(D5), p.9359-9374, 29 refs.

A dynamic-thermodynamic sea ice model is developed and coupled with a general circulation model to simulate the seasonal cycle of the global sea ice distribution. The coupled system yields a credible seasonal simulation of global sea ice. When monthly averaged atmospheric data (taken from the mean of the coupled run) are used to force the sea ice model, the seasonal cycle of sea ice extent (to the outer ice edge) is quite similar to that simulated in the interactive run. However, the actual sea ice covered area (i.e., excluding leads) differs considerably between the two simulations. Sea ice is more compact in the monthly averaged forced run than in the interactive run throughout the year in both hemispheres. The sea ice thickness distribution also differs between the two runs. In general, the sea ice is more open and thicker in the seasonal ice zone of the two polar regions for the interactive coupled case than for the mean forcing. (Auth. mod.)

F-55217

Jacobs, S.S., Hellmer, H.H., Jenkins, A., **Antarctic ice sheet melting in the southeast Pacific,** *Geophysical research letters,* May 1, 1996, 23(9), p.957-960, 19 refs.

The first oceanographic measurements across a deep channel beneath the calving front of Pine Island Glacier reveal a sub-ice circulation driven by basal melting of 10-12 m/yr. The salt box model described here gives a melt rate similar to that of ice balance and numerical models, 5-50 times higher than averages for the George VI and Ross Ice Shelves. Melting is fueled by relatively warm Circumpolar Deep Water that floods the deep floor of the Amundsen and Bellingshausen Sea continental shelves, reaching the deep draft of this floating glacier. A revised melt rate for ice shelves in the Southeast Pacific sector raises circumpolar ice shelf melting to 756 Gt/yr. Given the prior estimates of surface accumulation and iceberg calving, this suggests that the Antarctic Ice Sheet is currently losing mass to the ocean. (Auth.)

F-55220

Fuchs, A., Leuenberger, M.C., **δ^{18}O of atmospheric oxygen measured on the GRIP ice core document stratigraphic disturbances in the lowest 10% of the core,** *Geophysical research letters,* May 1, 1996, 23(9), p.1049-1052, 29 refs.

δ^{18}O measured on oxygen in the bubble air from ice cores is a proxy for continental ice volume and is used to synchronize cores from Greenland and Antarctica. A record measured on ice samples from the central Greenland deep ice core GRIP, spanning the Last Glacial Maximum and the Holocene, shows that δ^{18}O of atmospheric oxygen lags δ^{18}O of ice by about 4000 to 1000 years. The smooth isotope record of atmospheric oxygen shows a steady ice sheet decay beginning around 18,000 years BP, taking the time lag into account. However, measurements performed on ice from the GRIP core older than 100 kyr do not correlate with the corresponding Vostok record and show transitions too fast to be typical for ice sheet build-up or decay. (Auth. mod.)

F-55223

Zibordi, G., Meloni, G.P., Frezzotti, M., **Snow and ice reflectance spectra of the Nansen Ice Sheet surfaces,** *Cold regions science and technology,* May 1996, 24(2), p.147-151, 14 refs.

Reflectance spectra of glacier ice, lake ice and snow taken over the Nansen Ice Sheet, Antarctica, are presented and discussed. Glacier and lake ice spectra show very similar shapes with a maximum in the visible and a strong decrease in the very near infrared. The generally lower reflectance of lake ice with respect to reflectance of glacier ice, and the decrease in reflectance of lake ice from the green to the blue, with respect to the almost flat reflectance of glacier ice in the same spectral region, appear to be the most significant features when discriminating between the two ice types. Snow spectra show a decrease in reflectance, more marked in the near infrared, with grain size increase. Shallow snowpacks, compared to semi-infinite snow packs, show an appreciable decrease in reflectance in the visible due to reflectance contribution of the underlying ice surface. (Auth.)

F-55224

Haskell, T.G., Robinson, W.H., Langhorne, P.J., **Preliminary results from fatigue tests on in situ sea ice beams,** *Cold regions science and technology,* May 1996, 24(2), p.167-176, 15 refs.

Measurements of the fatigue characteristics of sea ice will give an indication of its possible failure mechanisms under repeated loading such as occurs with wave action and the operations of vehicles and aircraft. This paper presents the results of a series of fatigue experiments carried out in McMurdo Sound during the summer of 1992. The results presented here are in the form of a standard fatigue curve (with zero mean stress), that is stress amplitude versus number of cycles to failure, commonly known as an S-N curve. The endurance limit, that is the stress below which the sea-ice can withstand an unlimited number of cycles is, for sea ice *in situ*, approximately half the failure stress. (Auth. mod.)

F-55227

Stammerjohn, S.E., **Spatial and temporal variability in southern ocean sea ice coverage,** Santa Barbara, University of California, Dec. 1993, 111p., Master's thesis. 98 refs.

Spatial and temporal variability in southern ocean sea ice coverage are analyzed from Oct. 1978 to Dec. 1991. Sea ice coverage is calculated from passive microwave satellite data, using Scanning Multi-Channel Microwave Radiometer (SMMR) and Special Sensor Microwave/Imager (SSM/I) data. Spatial variability in sea ice coverage was based on eight regions: southern ocean, Weddell, Indian, West Pacific, Ross, Amundsen and Bellingshausen regions, as well as a subregion of the Bellingshausen, the Long Term Ecological Research (LTER) study area located west of the Antarctic Peninsula. The six adjacent southern ocean regions all show unique interannual variability which is confirmed by cross spectral analysis of monthly anomalies, and no two regions have the same anomalous years of extreme maximum or minimum ice coverage. Regional interannual variability appears to be a yearly re-distribution of near constant ice coverage for the whole southern ocean, and in extreme high or low ice years there are asymmetries in southern ocean ice coverage. Spectral analysis of monthly anomalies confirmed that most of the variance in regional ice coverages is due to interannual variability. (Auth. mod.)

F-55228

Nikitin, V.A., Sukhorukov, K.K., **Stresses in sea ice in the neigh-**

boring force interaction zone, *Russian meteorology and hydrology,* 1995, No.1, p.44-51, Translated from Meteorologiia i gidrologiia. 6 refs.

This paper generalizes results from various experiments with loading (natural or artificial) of local ice volumes in field conditions, which permit a space-time separation of elastic and plastic ice deformation processes in the contact zone. Initial data included material gained from expeditions in the Gulf of Finland (Baltic Sea, 1981), Sakhalin Shelf (Sea of Okhotsk, 1989), Baidaratskaya Bay (Kara Sea, 1991), and also in Arctic (Arctic Ocean, 1980, 1990) and Antarctic (Weddell Sea, 1992) pack ice conditions. (Auth. mod.)

F-55276

Hall, N.M.J., Valdes, P.J., Dong, B.W., **Maintenance of the last great ice sheets: a UGAMP GCM study,** *Journal of climate,* May 1996, 9(5), p.1004-1019, 31 refs.

A 5-yr simulation of the last glacial maximum using the UGAMP General Circulation Model is presented. It has a full seasonal cycle, T42 resolution, and interactive land surface and sea ice. Boundary conditions of sea surface temperature, sea ice extent, and land ice elevation are taken from the CLIMAP dataset, and orbital parameters and carbon dioxide concentration are adjusted. It is compared with a 10-yr simulation of present-day climate using the same model. The results are analyzed in terms of processes leading to the maintenance of the atmospheric circulation and temperature structure, mid-latitude transient behavior, precipitation, and eventually accumulation of ice over the glaciers. The model responds in a similar manner to previous studies in global mean statistics but differs in its treatment of regional climates. Changes in sea ice and orography are equally important in determining the positions of the upper-level jets. The Atlantic jet and storm track in particular are much stronger than in the present-day simulation, and the associated distribution of precipitation and snowfall changes accordingly. Both major ice sheets are maintained by snowfall at the center and ablation at the edges at a reasonable rate through the annual cycle. (Auth. mod.)

F-55286

Markus, T., Burns, B.A., **Wind events compared with polynya area estimates derived from SSM/I data,** EARSEL Workshop on Microwave Remote Sensing of Ice, Technical University of Denmark, Lyngby, June 7-9, 1993, Paris, European Association of Remote Sensing Laboratories, 1993, 21p. + figs., WDCA 93000627, 19 refs.

Different methods for estimating ice concentration as well as special polynya detection algorithms are applied to passive microwave data (here SSM/I) to determine the size of small coastal polynyas in the Weddell Sea region for Sep. 1989. The detection algorithms are 1- and 2-dimensional polynya signature models (PSM) based on generation of synthetic microwave images of polynya events. These models are compared with measured microwave data of the 37 GHz vertical polarization channel. The results from all methods are compared with wind data and model calculations of polynya size in a case study for a region close to Halley Bay. All passive microwave methods resolve single peaks in the history of the polynya size but differ significantly in absolute area measured and its fluctuation. The 2-D PSM, presented here for the first time, shows best correlation with wind data (Correlation Coefficient CC=0.78) and with the model (CC=0.80). It has a bias of 41 km^2 and an rms error of 173 km^2. This is acceptable, given the coarse resolution of approximately 625 km^2 for one SSM/I pixel.

F-55308

Ren, J.W., Qin, D.H., Allison, I., Higham, M., Goodwin, I.D., **Study of snow stratigraphy and accumulation-rate change in the west part of the Lambert Glacier basin, East Antarctica,** *Journal of glaciology and geocryology,* Sep. 1995, 17(3), p.274-282, In Chinese with English summary. 16 refs.

The Lambert Glacier Basin, over 10^6/km^2 in area, is a special region because of its distinct topography. A vast amount of stratigraphy observation of firn-core and snow-pit profiles indicates that the visible stratigraphic features are well preserved at relatively high accumulation sites. However, due to the effect of strong katabatic wind and microrelief, annual accumulation varies greatly over short distances, and as a result, several snow profiles or multi-year stake data are necessary for determination of the accumulation rate at a site. The derived accumulation rate series from comparison of stratigraphy, $\delta^{18}O$ and electric conductivity profiles were verified by the early measurement result at a higher accumulation site. In comparison with other regions such as Wilkes Land and Mizuho Plateau, the most notable characteristic in this region is that the accumulation rate is very low toward the coast, implying that the influence of local oceanic vapor and low air current is not important. The accumulation rate has an overall decrease trend over the past 50 years in this region, in contrast to the reported increase trend of recent decades for other regions in Antarctica. (Auth. mod.)

F-55329

Liu, L.B., Kang, J.C., Wen, J.H., Wang, D.L., **Chemical composition analysis of antarctic ice and snow: a comparison between capillary ion analysis and ion chromatography,** *Antarctic research (Chinese edition),* 1996, 8(1), p.65-72, In Chinese with English summary. 25 refs.

In contrast to traditional ion chromatography (IC), an advanced analysis technology, capillary ion analysis (CIA) is discussed. The method has many advantages such as rapid analysis, high resolution, good separation, simple sample treatment, less volume of sample and convenient maintenance. It is suggested that CIA will play an important role in the analysis of antarctic ice and snow, replacing the IC method usually used in the field at present. (Auth. mod.)

F-55361

Casassa, G., **INACH expedition to Patriot Hills, Nov.-Dec. 1995** [Expedición de INACH a Patriot Hills, noviembre-diciembre 1995], *Boletín Antártico Chileno,* May 1996, 15(1), p.20-24, In Spanish with English summary. 2 refs.

The second Chilean glaciological expedition to Patriot Hills took place between Nov. 4 and Dec. 6, 1995. The following measurements were carried out: snow pit observations in a pit 5.20 m deep, velocity and surface elevation of the glacier by means of a topographic survey, ablation/accumulation with snow stakes, and ice thickness by means of an impulse radar, covering an area within 5 km of the base camp, which was deployed beside the blue icefield at Patriot Hills. The expedition was organized and sponsored by the Instituto Antártico Chileno (INACH), with the support of the Fuerza Aérea de Chile (FACH). (Auth.)

F-55368

Shiraiwa, T., et al, **Glaciological data collected by the 35th Japanese Antarctic Research Expedition during 1994-1995,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.211, 69p., Refs. passim.

This report presents an outline of field observations carried out by JARE-35 in 1994-1995. Data on net snow accumulation and surface meteorological data, obtained during 4 oversnow traverses and at Dome Fuji and Mizuho stations are discussed and presented in tables.

F-55415

Ishida, K., Ohshima, K.I., Yamanouchi, T., **On sea ice off Syowa Station, Antarctica, derived from MOS-1/1b·MESSR mosaics—possibilities of sea ice detection,** International Symposium on Okhotsk Sea and Sea Ice, 11th, Mombetsu, Hokkaido, Japan, Feb. 25-28, 1996. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1996, p.122-127, In Japanese with English summary. 4 refs.

NOAA-AVHRR data have been received since 1980 at Showa Station. Reception of data from the Japanese Marine Observation Satellite (MOS)-1 started in 1989. Unfortunately, reception of NOAA satellite images at Showa had to be discontinued due to ageing of equipment in the middle of 1991. However, reception of data from MOS-1/1b have been continued constantly up to the present time. A purpose of this study is to understand characteristics of sea ice off Showa Station by using these MOS-1/1b·MESSR images. Among the data obtained from Feb. 1989 to Jan. 1993, the authors selected about 2,300 images in which the sea ice condition can be seen. In this study, mosaics of MOS-1-1b·MESSR Quick Look (Q/L) images are used for the analysis. (Auth. mod.)

F-55517

Swithinbank, C., **Morphology of the inland ice sheet and nunatak areas of western Dronning Maud Land,** Norwegian-British-Swedish Antarctic Expedition, 1949-52. Scientific results, Vol.III, D, Oslo, Norway, Norsk Polarinstitut, 1959, p.99-117 + Fig.2 and Plates, 13 refs.

The surface of the inland ice sheet is smooth and almost featureless. Crevassing is confined to marginal areas and to Ice Stream A. The surface contours of the ice sheet reflect, in a very subdued manner, the contours of the rock bottom. The mountain range along the edge of the plateau is composed of mainly metamorphic rocks; everything to the north and west is sedimentary. There are no signs of a pre-glacial pattern of water drainage, nor traces of water sculpturing. There are few true cirques but many incipient forms. Contemporary development is characterized by active scarp recession caused by ice abrasion and frost shattering. Summits are preserved intact. Pyramid forms represent the final stage in the breakdown of nunataks. Differential scarp recession is accentuated by the channelling of ice drainage from the plateau. The result is the alignment of nunataks in the direction of ice movement. Southern exposures have recently emerged from the ice sheet, while the northern remnants are in a late stage of destruction. (Auth. mod.)

F-55518

Swithinbank, C., **Regime of the ice sheet of western Dronning Maud Land as shown by stake measurements,** Norwegian-British-Swedish Antarctic Expedition, 1949-52. Scientific results, Vol.III, E, Oslo, Norway, Norsk Polarinstitut, 1959, p.123-143 + Plates, 11 refs.

The object of the study of regime was to measure the amount of accumulation inland. 138 stakes spread over a 300 km route were measured four times in 16 months. The heaviest accumulation, up to 3 m of snow in 12 months, is found on local summit areas; orographic precipitation is the probable explanation. Regime is positive at all points, but local variations are very great. Katabatic winds remove snow from convex surfaces and slopes and allow it to come to rest on nearby flat areas. The scale of the dumping of snow at the foot of slopes is proportional to the length of slope and the altitude interval, but accumulation maxima always lie close to the foot of the slope. There is no evidence to support the view that large quantities of snow are removed from the inland ice sheet and spread widely over the adjacent ice shelves. The proportion of summer to annual accumulation is analyzed; there are considerable variations along the route. These can be explained by local orographic precipitation, which is heaviest in summer. (Auth. mod.)

F-55540

Smith, N.D., Ashley, G.M., **Study of brash ice in the proximal marine zone of a sub-polar tidewater glacier,** *Marine geology,* July 1996, 133(1-2), p.75-87, 48 refs.

Intermittent calving of tidewater Maar Glacier into Arthur Harbor (Anvers I., Antarctic Peninsula) produces mainly brash ice (fragments <2 m in diameter). To assess the potential role of brash ice in the seaward transport of glacigenic sediment in this subpolar region, measurements were made of (1) brash melt rates under laboratory and field conditions and (2) size distributions of freshly calved brash. In constant-temperature (1°C) laboratory runs, melt rates for similarly shaped bergs increased significantly with relative flow velocity and were also greater for bergs containing fractures or air bubbles. Under field conditions, brash bergs subjected to rough open water were observed to melt approximately 20 times faster (range=12-26) than those locked in densely packed jams protected from wave and current action. For an average population of freshly calved brash subjected to mean open-water melt rates observed in Arthur Harbor, over 90% of the bergs will completely melt within 24 hours. Consequently, little brash escapes the proximal marine zone, and most debris rafted by such bergs is probably deposited within a few hundred meters of the glacier terminus. (Auth. mod.)

F-55563

Faure, G., Wehn, K.S., Montello, J.M., Hagen, E.H., Strobel, M.L., Johnson, K.S., **Isotope composition of the ice and subglacial geology near the Allan Hills, Victoria Land, Antarctica,** Gondwana Symposium, 8th, Hobart, TAS, Australia, June 21-24, 1991. Proceedings. Gondwana eight: assembly, evolution and dispersal, edited by R.H. Findlay, R. Unrug, M.R. Banks, and J.J. Veevers, Brookfield, VT, A.A. Balkema Publishers, 1993, p.485-495, Refs. p.493-494.

Rock clasts and sediment deposited by the east antarctic ice sheet in supraglacial moraines and along the ice edge can provide information about the subglacial geology of East Antarctica. Such studies are enhanced by using the isotope composition of the ice to constrain its provenance. The $\delta^{18}O$ values of ice collected at regular intervals along surveyed lines near the Elephant and Reckling moraines on the east antarctic ice sheet west of Victoria Land range from -42.6 to -50.4 per mill relative to standard mean ocean water (SMOW). Ice adjacent to the Allan Hills has a significantly different isotope composition, with $\delta^{18}O$ values between -35.2 and 042.0 per mill. These results indicate that the ice presently exposed at the Elephant and Reckling moraines originated from the eastern slope of the central ice divide in East Antarctica. The less negative $\delta^{18}O$ values of the ice at the Allan Hills indicate either that the ice originated from a local source close to the Transantarctic Mountains or that it formed during an interglacial stage of the Pleistocene epoch, whereas at least some of the ice at the Elephant and Reckling moraines formed during glacial stages. (Auth. mod.)

F-55583

van Ommen, T.D., Morgan, V., **Peroxide concentrations in the Dome Summit South ice core, Law Dome, Antarctica,** *Journal of geophysical research,* June 27, 1996, 101(D10), p.15,147-15,152, 18 refs.

Measurements of H_2O_2 concentrations have been made at intervals along the full length of the Dome Summit South ice core from Law Dome. These results show mean peroxide concentrations of approximately 37 parts per billion by mass over the past 4 kyr and a tendency for concentrations to decrease with age. The rate of H_2O_2 decay in antarctic ice appears slower than in Greenland ice and the pattern of measurements suggests an abrupt increase in concentration during the emergence from the last glacial into the Holocene. Detailed examination of the timing of the seasonality in H_2O_2 and $\delta^{18}O$ shows that peroxide extrema occur very near the solstices. The seasonal curves have been used to derive atmospheric seasonal H_2O_2 curves based on possible air-snow partitioning models. These show a broad low in atmospheric concentration with a sharp peak which is again very near the summer solstice. (Auth. mod.)

F-55600

Siegert, M.J., Dowdeswell, J.A., Gorman, M.R., McIntyre, N.F., **Inventory of Antarctic sub-glacial lakes,** *Antarctic science,* Sep. 1996, 8(3), p.281-286, 12 refs.

An extensive analog database of 60 MHz radio-echo sounding records of Antarctica (covering 50% of the ice sheet) is held at the Scott Polar Research Institute, University of Cambridge. This database was analyzed in order to determine the presence and location of antarctic sub-glacial lakes. In total, 77 sub-glacial lake-type records were identified, 13 more than detected in previous studies. An inventory of these sub-glacial lakes includes geographical coordinates, minimum length and overlying ice thickness for each lake. Information concerning the location of the lakes indicates that the majority (ca. 70%) are found in the proximity of ice divides at Dome Charlie and Ridge B within East Antarctica. (Auth.)

F-55602

Doran, P.T., McKay, C.P., Meyer, M.A., Andersen, D.T., Wharton, R.A., Jr., Hastings, J.T., **Climatology and implications for perennial lake ice occurrence at Bunger Hills Oasis, East Antarctica,** *Antarctic science,* Sep. 1996, 8(3), p.289-296, 13 refs.

The Bunger Hills contain many lakes, only a few of which maintain an ice cover all year. To understand the environmental conditions that allow for persistent ice cover, the authors established an automatic meteorological station on White Smoke Lake, a perennially ice-covered lake in contact with the Apfel Glacier. The data were collected from Jan. 1992-July 1993. The mean annual solar flux during this period was 115 W/m^2, the mean wind speed 4.6 m/s, and the mean air temperature -11.2°C. Summer degree-days above freezing are similar to regions of the Antarctic (the McMurdo Dry Valleys) with thick perennial lake ice but the winter freezing degree days are much smaller and are closer to regions with seasonal ice covers. The Bunger Hills seem to be in a marginal climatic region for the persistence of thick lake ice. Therefore, the extent of glacier ice contact becomes the controlling factor in maintaining an ice cover all year. It is proposed that this is either through the heat sink the glacier offers, and/or the positive feedback for ice growth provided by the high albedo of the adjacent glacier. (Auth.)

F-55616

Schytt, V., **Snow studies at Maudheim,** Norwegian-British-Swedish Antarctic Expedition, 1949-1952, Scientific results, Vol.IV A, Oslo, Norsk Polarinstitutt, 1958, p.5-63 + Plates IV A, 1-3, Refs. p.111-112.

The paper opens with brief reviews of the early snow studies (Expeditions) made during the period 1888-1913 in Greenland and from 1897 through 1941 in Antarctica. In the first glaciological pit examined at Maudheim on Sep. 30, 1950, thin layers of depth hoar or exceptionally coarse-grained firn were found to separate the fine-grained snow or firn on top of them from the ice-rich, once watersoaked firn below. Each very coarse stratum was interpreted as having been exposed to the warmth of an antarctic summer and further pit observations (Nov. 30, 1951 and Jan. 10, 1952) compared with snow stake measurements proved this to be the case. During the winter of 1951 a "deep pit" (11.8 m) was dug at Maudheim. The following observations were made: annual stratification; density variation with depth; grain size variation with depth and settling of the firn. Details of these observations are presented and discussed. (Auth. mod.)

F-55617

Schytt, V., **Snow studies inland,** Norwegian-British-Swedish Antarctic Expedition, 1949-1952, Scientific results, Vol.IV B, Oslo, Norsk Polarinstitutt, 1958, p.65-112 + Plates IV B, 1-6, Refs. p.111-112.

The glaciological program of the N-B-S-A Expedition included a study of the regime of the inland ice sheet and of the ice shelves along the coast. Since no net ablation occurred except in a few very limited areas, the regime study was restricted to a study of accumulation. The snow stake measurements along the main route from Maudheim to the Advance Base are discussed in Vol. III E. In the present paper all results obtained from snow pits are described and discussed. Very good correlation was observed between stratigraphic details at Maudheim and in pits as far away as 200 km, but the greater the distance to the coast, the more difficult the interpretation of observed stratification. In certain areas the interpretation was made more difficult by the frequent formation of double summer surfaces. No significant general increase or decrease in accumulation with increasing distance from the coast could be observed within about 350 km of the coast. On the other hand, on the inland plateau the accumulation dropped about 50% according to the few observations available. The mean annual accumulation of the area between the coast and the inland plateau during 1949 and 1950 was 25 cm of water and most observations were within 5 cm of the mean value. (Auth. mod.)

F-55618

Schytt, V., **Inner structure of the ice shelf at Maudheim as shown by core drilling,** Norwegian-British-Swedish Antarctic Expedition, 1949-1952, Scientific results, Vol.IV C, Oslo, Norsk Polarinstitutt, 1958, p.113-148 + summary, refs., and Plates IV C, 1-8, 36 refs.

By means of a core drilling machine a hole was bored in Maudheim to a depth of 100 m below the ice shelf surface and cores were recovered for structural studies. From known facts about density distribution, height of the ice shelf above sea level, and density of the sea water, the thickness of the free-floating ice shelf has been calculated. The result is 190 m with an error probably not exceeding ±6 m. The crystal area was studied in thin sections and increased with depth. When plotted in a diagram the observations between 1 m and 70 m do not deviate much from a straight line; below 70 m the rate of crystal area increase becomes considerably greater. The frequency of large crystals (more than 8 mm^2 in area) also shows a sudden increase at 70 m depth. This discontinuity has been explained as showing the boundary between the accumulation deposited on the ice shelf and the ice supplied from the inland ice sheet. It has been concluded that no prominent, regular change in orientation pattern takes place down to 100 m depth in the ice shelf at Maudheim. (Auth. mod.)

F-55625

Loewe, F., **Contributions to the mass balance of the antarctic ice sheets** [Beiträge zum Massenhaushalt des antarktischen Inlandeises], *Petermanns Geographischen Mitteilungen,* [Oct.] 1961, No.4, p.269-274, In German with English and Russian summaries. 47 refs.

According to recent observations the mean annual accumulation of the antarctic continent is equivalent to at least 10-12 cm of water. Rime, hoar-frost and evaporation are small items and balance approximately in the overall budget. Melting in the border regions and at the ice edge and calving remove only a small fraction of the accumulation. Removal of ice from the faster moving glaciers and ice shelves is of greater importance. The transport of drift snow might be important, but would be already included in the values of the net accumulation. Melting at the bottom of floating ice shelves might be substantial, but it would occur only in parts of the circumantarctic. Overall the present mass budget of the antarctic continent shows a gain in substance. The present rise in sea level might be caused by other reasons than a shrinking of the ice caps, such as by a slight warming of the oceans. (Auth.)

F-55627

Hansen, I., Greve, R., Hutter, K., **Application of a polythermal ice sheet model to the antarctic ice sheet: steady-state solution and response to Milanković cycles,** International Symposium on Thermal Engineering and Sciences for Cold Regions, 5th, Ottawa, May 19-22, 1996. Proceedings. Edited by Y. Lee and W.L.H. Hallett, Ottawa, University, Department of Mechanical Engineering, 1996, p.89-96, 9 refs.

Several computations with the authors' three-dimensional polythermal ice sheet model SICOPOLIS are performed for the Antarctic Ice Sheet. The distinctive feature of this model is the detailed consideration of the basal temperate ice layer, in which the water content and its impact on the ice viscosity are computed; its transition surface to the cold ice region is treated by accounting for the continuum-mechanical jump conditions that hold on this interface. The presented simulations cover two types of scenarios, namely (i) a steady-state simulation under present climate conditions, and (ii) sinusoidal Milankovitch-period forcing with the three Milankovitch periods of 10, 40 and 100 thousand years, respectively. (Auth.)

F-55628

Hadji, L., **Floating convection induced by the freezing of seawater,** International Symposium on Thermal Engineering and Sciences for Cold Regions, 5th, Ottawa, May 19-22, 1996. Proceedings. Edited by Y. Lee and W.L.H. Hallett, Ottawa, University, Department of Mechanical Engineering, 1996, p.213-218, 8 refs.

The ice cover that forms during the freezing of antarctic water acts as an insulating barrier that inhibits the release of oceanic stored heat into the atmosphere. This heat stored within moderately deep ocean water comes from the latent heat released during the freezing process and from absorbed solar radiation. During the formation of either coastal or open-ocean polynyas, the cold salty water that underlies the seawater-ice interface becomes suddenly open to the frigid atmospheric air and an upward heat flux ensues. To quantify the role of convection in the sea-ice-atmosphere interaction in polar regions, the authors have carried out a detailed study of the coupling between thermosolutal convection and solidification in a layer of seawater. These convective flows result from the partial solidification of seawater from above. A mathematical model based on the conservation equations of heat, salt, mass and momentum is derived. Several parameters appear in the mathematical formulation, and only one, the Rayleigh number, plays the role of bifurcation parameter. The study is numerical and is based on the finite difference method. (Auth. mod.)

F-55629

Koci, B.R., Nagornov, O.V., Zagorodnov, V.S., Kelley, J.J., **Hot water drilling of large diameter holes in cold ice,** International Symposium on Thermal Engineering and Sciences for Cold Regions, 5th, Ottawa, May 19-22, 1996. Proceedings. Edited by Y. Lee and W.L.H. Hallett, Ottawa, University, Department of Mechanical Engineering, 1996, p.312-317, 12 refs.

The Antarctic Muon and Neutrino Detector Array (AMANDA) requires large diameter (0.6 m) holes to a depth of nearly 2 km to install photodetectors in ice. During the 1993-94 field season a Hot Water Drilling (HWD) system was used to drill 4 holes to 1 km depth. The drilling process and its thermal effects in ambient ice were modeled. The calculated models were matched against the measured data collected during the drilling and freezing process. These models indicate a potential increase of 50% in drilling rate over the present HWD. This paper describes the AMANDA HWD system, the drilling log data, and models which allow users to calculate an optimal drilling schedule, time of closure, and shape of the hole. (Auth.)

F-55632

Blaisdell, G.L., Lang, R.M., **Pegasus: a glacial-ice runway for wheeled flight operations at McMurdo Station,** *Antarctic journal of the United States,* 1995, 30(1-4), p.7-10.

The McMurdo Station glacial-ice runway was developed over a 5-year period and now provides access to heavy wheeled aircraft for much of the austral summer field season. Benefits of the runway include reduced wear and tear on airframes, more efficient use of aircraft and flight crews, less wasted time by science and support personnel, enhanced morale, assurance of stocking South Pole before station closings, increased efficiency for cargo handlers, and timely station close-out. Access by much of the world's aircraft and the potential for winter flights are also gained. To date, about 78 flights have operated from the glacial-ice runway yielding a savings of 39 flights.

F-55635

Jeffries, M.O., Cushing, S., Porter, M., **Sea-ice development in the Ross, Amundsen and Bellingshausen Seas revealed by analysis of ice cores in late winter 1993 and 1994,** *Antarctic journal of the United States,* 1995, 30(1-4), p.16-18, 7 refs.

In Aug. and Sep. 1993, the authors made the first comprehensive investigation of first-year sea-ice development in the Bellingshausen and eastern Amundsen seas. In Sep. and Oct. 1994, they investigated first-year sea-ice development in the western Amundsen and eastern Ross Seas. This article presents the results of the 1994 investigation and compares them with the 1993 results. Both data sets were obtained in late winter aboard the R/V *Nathaniel B. Palmer.* The 1993 and 1994 cruise tracks and sampling locations are illustrated in a figure.

F-55636

Jeffries, M.O., Jaña, R., Li, S., McCullars, S., **Sea-ice-and snow-thickness distributions in late winter 1993 and 1994 in the Ross, Amundsen, and Bellingshausen Seas,** *Antarctic journal of the United States,* 1995, 30(1-4), p.18-21, 7 refs.

The sea-ice and snow-thickness distributions in the Bellingshausen and eastern Amundsen seas were studied for the first time during Aug. and Sep. 1993. The first investigation of the sea-ice and snow-thickness distribution in the western Amundsen and eastern Ross Seas was made in Sep. and Oct. 1994. This article presents the results of the 1994 study and compares the data with the 1993 measurements.

F-55637

Sturm, M., Morris, K., Massom, R., **Description of the snow cover on the winter sea ice of the Amundsen and Ross Seas,** *Antarctic journal of the United States,* 1995, 30(1-4), p.21-24, 13 refs.

Combined snow and sea-ice studies were conducted from the R/V *Nathaniel B. Palmer* in the pack ice of the Amundsen and Ross seas between Sep. 10 and Oct. 21, 1994. In all, measurements were made in 139 snow pits and 21 trenches (mean depth: 32.4 cm). In total, 2,400 measurements of snow depth and snow-ice interface temperatures were made. In general, the snow cover comprised four distinctly different types of snow: soft or moderately hard fine-grained snow layers; depth hoar layers; icy layers, melt-clusters, and percolation columns; and new or recent snow. The icy features exhibited textures suggestive of formation during high winds.

F-55638

Jeffries, M.O., Chuah, T.S., Morris, K., **C-band radar backscatter from antarctic first-year sea ice: I. *In situ* scatterometer measurements,** *Antarctic journal of the United States,* 1995, 30(1-4), p.24-26, 8 refs.

In Aug. and Sep. 1993, the R/V *Nathaniel B. Palmer* operated in the Bellingshausen and Amundsen seas in support of a study of sea-ice geophysics. This included an investigation of *in situ* radar backscatter variability from first-year ice using a scatterometer mounted on the ship and of backscatter variability in SAR images derived from data acquired by the ERS-1 satellite. This article describes some of the results of the *in situ* scatterometer measurements.

F-55639

Morris, K., Jeffries, M.O., **C-band radar backscatter from antarctic first-year sea ice: II. ERS-1 SAR measurements,** *Antarctic journal of the United States,* 1995, 30(1-4), p.26-27, 8 refs.

Because some of the surface properties and processes of antarctic sea ice differ from those of arctic sea ice, one would expect the radar backscatter response to differ as well. These potential differences were the subject of an investigation in Aug. and Sep. 1993 when the R/V *Nathaniel B. Palmer* operated in the pack ice of the Bellingshausen and Amundsen seas. At the time the ship was in the ice, ERS-1 C-band, vertical-vertical (VV) polarized synthetic aperture radar (SAR) data were acquired. The ERS-1 SAR backscatter variations are the subject of this article.

F-55643

Swithinbank, C., **Movement of the ice shelf at Maudheim,** Norwegian-British-Swedish Antarctic Research Expedition, 1949-1952, Scientific results, Vol.III, C, Oslo, Norsk Polarinstitutt, 1958, p.79-95 + refs. and Plate I, 12 refs.

Measurements of surface deformation near an ice front are described. The work is concerned with relative rather than with absolute movement. Measurements are made on 18 stakes spread over an area of 34 km^2 within 6 km of the ice front of Maudheim Ice Shelf. The relative position of each stake is fixed by plane triangulation from a 2 km base line. Two surveys some months apart establish the amount of deformation in the interval between. Computation involves the development of techniques allowing for movement of stakes during periods in which surveys are in progress. Reduced angles are used to locate points by graphical intersection. Deformation is neither radial nor parallel, but transitional. There is rapidly diverging flow near the ice front. Depressions are preserved by a continuous downward movement of their flooring with respect to their sides. The relationship between regime and movement figures shows that in equilibrium, two-thirds of the accumulation are dispersed by a continual increase of surface area, while one third is removed by melting from below. Further melting results in thinning of the ice sheet and a surface slope towards the ice front. The ice shelf shows no measurable response to short-period variations in the amount of accumulation. A rough calculation of the material balance of the Maudheim Ice Shelf drainage area gives an indication of the true rate of seaward movement of Maudheim. (Auth.)

F-55672

Fukuzawa, H., Ikeda, T., Hondoh, T., Lipenkov, V.IA., Mae, S., **Aging effects on translational lattice vibrations in ice I_h,** *Physica B,* Apr. 1996, Vol.219/220, PHONONS 95: Proceedings of the Combined Conference of the 4th International Conference on Phonon Physics and the 8th International Conference on Phonon Scattering in Condensed Matter, Sapporo, Japan 23-28 July 1995. Edited by T. Nakayama, S. Tamura, and T. Yagi, p.466-468, 8 refs.

Laser-Raman spectra of Vostok ice recovered from Antarctica have been measured in a frequency range of 10-400/cm in order to observe long-term aging effects on Raman spectra of ice I_h. The authors found that the intensity of the peak at 300/cm increased as the depth of the ice core increased from 500 to 2452 m. Since no change in the peak height was observed by pressurization, the increase of the peak intensity is attributed to the aging effect on a structural change of ice during a very long period from 28,000 to 209,000 yr. Since this peak is assigned to a translational lattice vibration traveling along the hydrogen bonds, it follows that the proton arrangement in the antarctic ice varies with very long term aging. (Auth.)

F-55687

Kikuchi, K., Harada, M., Uyeda, H., **Morphological studies on the polycrystalline snow germs,** *Hokkaido University. Faculty of Science. Journal. Series VII (Geophysics),* Feb. 1992, 9(2), p.235-251, 16 refs.

From among a number of microphotographs of ice and snow crystals photographed in the ice needle and ice fog phenomena observed in the arctic and antarctic regions, polycrystalline initial ice crystals (poly-snow germs) were selected and classified into 12 types. Most of them were crossed-plates type and their formation rate was approximately 5%. To investigate the shapes of artificial poly-snow germs and their production rate, laboratory experiments using a cloud chamber were carried out under temperature conditions between -18 and -42°C. As a result, almost all shapes that were observed in nature were produced in the chamber and the production rate was less than 5%. This value was similar to that of observational results. As one mechanism of the growth of these poly-snow germs, the cubic structure model which was introduced for snow polycrystals (Furukawa 1982) might be possible. (Auth.)

F-55714

Han, J.K., **Evidence from an ice core: the alternation of cold and warm summer during the past 150 years at the top area of the Law Dome ice cap, East Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.62-68, In Chinese with English summary. 7 refs.

DLC G845.5.C45 1989 Orien China

Stratigraphic analyses of a firn/ice core more than 60 m long, drilled at the top of Law Dome, show that no infiltration ice layer resulting from melt events exists below 33 m. The regelation ice layers formed under weaker ablation conditions decrease with increasing depth; groups of infiltration ice layers appear within a 10 m interval above 33 m; the indicated periods between the neighbouring groups are 22, 26 and 21 years. Infiltration ice occurs twice in each group about 2 m apart, which is equal to the thickness of annual snow accumulation during 5 summers. It is concluded that the summer season at the top of Law Dome has undergone a transitional change from cold to warm in the last 150 years, exhibiting a periodic fluctuation of 22-23 years. (Auth. mod.)

F-55781

Ramseier, R.O., Arnon, I., Ezraty, R., Garrity, C., Gohin, F., Strübing, K., **Potential role of ERS-1 scatterometer data in support of ice navigation,** Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.169-174, ESA SP-365, 8 refs.

DLC QE33.2.A7W67 1994

Ice information in support of navigation covers essentially any knowledge about ice conditions which might be useful to the master of the ship to decide which route to take and how to navigate around large ice floes. Satellite based sensors, primarily those operating in the microwave region, can provide this information day and night and under most weather conditions. To date, passive microwave brightness temperature data originating from sensors such as the Special Sensor Microwave/Imager are reasonably well understood, and can with suitable algorithms be presented as useable ice information products, such as ice concentration and extent. The scatterometer backscatter coefficient σ^0 has the potential of being a useful parameter to describe the surface conditions of an ice cover, in particular to provide a roughness index. Combined with passive microwave data, these complementary data sets can contribute better information on ice type and surface conditions which in return permits a better basis for route selection. This paper focuses on the use of scatterometer and passive microwave data and surface measurements made with the German RV *Polarstern* during its winter cruise in the Weddell Sea, June-July 1992. (Auth.)

F-55782

Thomas, M., Schulze, O., Brandt, R., Roth, R., **Parameterization of lead formation in the Weddell Sea using SAR-derived ice velocity fields,** Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.183-188, ESA SP-365, 16 refs. Also presented at the 2nd Euro-Latin American Space Days, Buenos Aires, Argentina, May 9-13, 1994.

DLC QE33.2.A7W67 1994

The opening and closing of leads or polynyas in sea ice-covered regions governs the heat exchange between the ocean and the atmosphere. One of the most important questions in modeling dynamical and thermodynamical processes of sea ice is the temporal and spatial variability of open water/thin ice areas. To investigate this question, ice velocity fields are calculated from ERS-1 SAR images with 100m resolution along a transect at 67° southern latitude. The displacement vectors of significant ice structures are automatically generated by cross-correlations between pairs of SAR scenes from descending and ascending orbits. As an example, the divergence of an ice velocity field from July 14, 1992 is presented. Additionally, an ice classification approach based on radiometric and geometric properties and an estimation of sensible heat fluxes using additional meteorological data (synoptical analysis, ECMWF model) is shown. In free ice drift situations, the lead formation can be directly linked to the synoptic situation. (Auth.)

F-55797

Harder, S.L., Warren, S.G., Charlson, R.J., Covert, D.S., **Filtering of air through snow as a mechanism for aerosol deposition to the antarctic ice sheet,** *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,729-18,743, 42 refs.

In this paper the authors describe snow in the general framework of the theory of filters. Aerosol particle size distribution at the South Pole were measured for air drawn through snow filters of various lengths and flow rates. The authors compare the results to those of previous experiments and to a theoretical model for wind pumping. Three filter-theory models for aerosol deposition are tested using the data, and a temporal deposition coefficient is determined. The filter-theory models, as applied to the typical densities, pore-space sizes, and grain sizes of snow, are examined in detail. (Auth. mod.)

F-55814

Parkinson, C.L., Gloersen, P., **Global sea ice coverage,** Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.371-383, 37 refs.

DLC QC981.8.C5G87

SAR data have much finer resolution than passive microwave data, so that they are less appropriate for routine global coverage but can be used for identifying individual ice floes and carrying out the types of detailed studies also possible with visible and near infra-red imagery, although with the major advantage of not being hindered by cloud or darkness. SAR instruments have flown on NASA's Seasat in 1978, on the European Remote Sensing Satellite (ERS-1), launched in 1991, and on the Japanese Earth Resources Satellite (JERS-1), launched in 1992. A SAR instrument is also planned for the Canadian Radarsat scheduled for launch in 1995. The Seasat SAR data have been used in several sea ice studies. This paper presents passive microwave data and the results obtained from them. Sea ice distribution in both polar regions is analyzed. (Auth. mod.)

F-55815

Thomas, R.H., **Ice sheets,** Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.385-400, 31 refs.

DLC QC981.8.C5G87

A variety of remote-sensing techniques can be applied to ice-sheet investigations in both polar regions, using energy with wavelengths ranging from microns to meters. Here, attention is focussed on those techniques that can be applied from satellites, but mention is also made of airborne techniques that complement satellite sensors. These sensors will be reviewed under the broad classifications of imaging sensors and instruments for measuring ranges. (Auth. mod.)

F-55819

Wolff, E.W., ed, Bales, R.C., ed, **Chemical exchange between the atmosphere and polar snow,** North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global environmental change, Vol.43, Berlin, Springer-Verlag, 1996, 675p., Refs. passim. Proceedings of the NATO Advanced Research Workshop on Processes of Chemical Exchange Between the Atmosphere and Polar Snow, Il Ciocco, Italy, Mar. 19-23, 1995. For selected papers see 51-173 through 51-206 or F-55820 through F-55822, F-55827, F-55829, F-55831, F-55832, F-55834, I-55823 through I-55826, I-55828, I-55830 and I-55833.

DLC QC879.6.C45 1996

The NATO Advanced Research Workshop (ARW) was held at Il Ciocco, Tuscany, Mar. 19-23, 1995. The main goal of the workshop was to assess, improve, and summarize understanding of the processes that control the transfer of species between the atmosphere and the record that is finally seen in ice cores. The organization of this book follows the organization of the meeting. The first 3 papers discuss ice core records, what they have shown, and some of the problems that have been recognized. The next 5 papers describe what is known about the atmospheric transport and chemical composition of the arctic and antarctic atmosphere. Understanding of atmospheric transport is required in order to relate the source regions to the ice sheet, and therefore to elucidate the spatial representativeness of ice core data. These themes were extended by the next 2 papers, one describing the chemical reactions occurring in the polar troposphere, the other setting polar data in the context of global models of the atmosphere. The next section of the book covers mainly the recent field data. The theme of looking at individual processes continues in the remaining chapters of this volume. Beyond the invited papers, a day was devoted to workshop sessions, where the problems of different types of species were extensively discussed and summarized. The three working group reports are included, and can be considered a summary of the state-of-the-art for this topic in 1995; they include recommendations for what future work is required. A brief conclusion for the ice core community follows these reports.

F-55820

Wolff, E.W., **Record of aerosol deposited species in ice cores, and problems of interpretation,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.1-17, Refs. p.14-17.

DLC QC879.6.C45 1996

This chapter aims to show the potential of ice cores to deliver information on paleoatmospheric chemistry. It gives a flavor of the data that exist, and explains some of the difficulties involved in interpreting the ice core profiles in terms of atmospheric changes. The chapter concentrates on the chemical species that are delivered to the snow as aerosol (that is, as solid or liquid particles).

F-55821

Legrand, M., Léopold, A., Dominé, F., **Acidic gases (HCl, HF, HNO_3, HCOOH, and CH_3COOH): a review of ice core data and some preliminary discussions on their air-snow relationships,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.19-43, Refs. p.40-43.

DLC QC879.6.C45 1996

This paper focusses on the records of mineral (HCl, HF, and HNO_3) and carboxylic (formic: HCOOH and acetic: CH_3COOH) acids from Greenland and antarctic firn and ice cores and their atmospheric significance. The authors review available ice records and examine to what extent reliable information can be extracted in terms of chemical composition of past atmospheres. The firn records span the time period from the pre-industrial era to the present and are useful in investigations of the impact of human activities on the natural budget of these acidic species. The changes in acidic species levels seen in deep ice cores are discussed, spanning the last climatic cycle. To what extent some of these changes can be attributed to changes in atmospheric concentrations, due to modification of source strength or/and transport following past climate fluctuations, is considered.

F-55822

Neftel, A., **Record of gases and reactive species in ice cores, and problems of interpretation,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.45-69, Refs. p.67-69.

DLC QC879.6.C45 1996

Since the start of ice core drilling some 30 years ago, many different parameters have been measured and reported in the literature. Of great significance is the link to the corresponding atmospheric concentrations, which are related to the basic parameters of the Earth system. Ice, conserved well below the freezing point, contains 2 clearly distinguishable ways of carrying information of the past: composition of the gas enclosed in the bubbles, and trace species in the ice matrix. This paper focusses on the discussion of three "Earth system parameters": CO_2, H_2O_2 and HCHO. (Auth. mod.)

F-55827

Bales, R.C., Choi, J.Y., **Conceptual framework for interpretation of exchange processes,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.319-338, Refs. p.335-338.

DLC QC879.6.C45 1996

This paper addresses two central questions. First, what do we know about the processes governing the atmosphere-snow transfer for species that are "reversibly deposited" to snow? Reversibly deposited refers to species that have a significant presence in both the gas and condensed phases, and can undergo reversible exchange between snow or firn and the overlying atmosphere. Second, what more should we learn about the atmosphere-snow exchange process and subsequent changes in the snow/firn/ice in order to extract relevant climatic information about these species from ice-core records? This paper focuses on hydrogen peroxide (H_2O_2) as a model for the behavior of reversibly deposited species, though the conceptual model should also describe the behavior of formaldehyde (HCHO), nitric acid (HNO_3) and light organic acids (e.g. formic (HCOOH) and acetic (CH_3COOH)).

F-55828

Waddington, E.D., Cunningham, J., Harder, S.L., **Effects of snow ventilation on chemical concentrations,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.403-451, Refs. p.446-450.

DLC QC879.6.C45 1996

In this paper, the authors outline the current theoretical basis for calculating air flow in polar firn. They first review the role of snow ventilation in the capture of aerosols from Gjessing (1977) to the present. They then estimate the transport resistance for windpumping to assess whether windpumping is a rate-limiting factor in aerosol deposition, concluding that a realistic windpumping model of aerosol deposition is necessary to reconstruct paleoclimate conditions from ice core aerosol records. They show that ice core records for reversibly deposited species that have undergone post-depositional changes without achieving equilibrium with the atmosphere prior to deep burial will be difficult to interpret; ventilation is instrumental in helping reversibly deposited species reach equilibrium. Finally, they speculate on the relative importance of ventilation for the concentrations of irreversibly and reversibly deposited species in Greenland and Antarctica now and at the Last Glacial Maximum (LGM), and identify areas of windpumping theory that require further research.

F-55829

Pomeroy, J.W., Jones, H.G., **Wind-blown snow: sublimation, transport and changes to polar snow,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.453-489, Refs. p.485-489.

DLC QC879.6.C45 1996

Blowing snow is ubiquitous in polar regions and undergoes relatively rapid sublimation whilst in transit. The erosion, transport and deposition of blowing snow dramatically transforms the physical and chemical characteristics of polar snow. Processes active during snow transport are sublimation, thermophoresis, diffusiophoresis, electrophoresis and ventilation; these processes occur at much higher rates than for *in-situ* surface snow. Conditions suitable for photochemistry exist in blowing snow particles, though no strong empirical evidence exists for such reactions in snow. Annual accumulations of snow and ions on polar ice-sheets are a residual of the blowing snow phenomenon and therefore a result of the interaction of wind speed, temperature and snowfall regimes with surface topography and the meteorological history of the snowpack. Chemical transformations in blowing snow involve ion conservation, scavenging, volatilization, resuspension and consumption. Experimental evidence from Canada, Scotland and the Antarctic shows that for moderate blowing snow regimes the first three processes dominate whilst for severe regimes resuspension dominates. (Auth. mod.)

F-55831

Schwander, J., **Gas diffusion in firn,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.527-540, 26 refs.

DLC QC879.6.C45 1996

Different components and properties of the ice deposits on the earth store information on the climate and environment. One can mainly distinguish among three storage types: properties and isotopic composition of the ice itself; solid (and liquid) trace substances in the ice; and gaseous and volatile components. This article reviews some aspects of the transfer of gaseous components from the atmosphere to the ice, including porosity data published for Siple Station. The porosity of the firn decreases gradually from the surface to the depth of firn-ice transition where the pores are pinched off to form isolated air bubbles. Near the snow surface the porosity (defined as the void volume fraction) is about 0.6 to 0.7, corresponding to a density of about 350 kg/m^3. Under cold polar conditions there are only a few bubbles closed off at porosities above 0.15 (density 780 kg/m^3), which is reached about 10 m above the final close-off depth.

F-55832

Wolff, E.W., **Location, movement and reactions of impurities in solid ice,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.541-560, Refs. p.558-560.

DLC QC879.6.C45 1996

The aim of drilling ice cores is to obtain paleoatmospheric information of wide significance. However, the concentrations of chemicals found in the ice are determined both by the atmospheric concentrations and by depositional and post-depositional processes. There is the possibility that chemical changes can occur, at least to more complex species, over the long timescales that are relevant for ice. Diffusion is bound to take place to some extent, affecting the apparent rate of temporal change inferred from ice core profiles. Discussion of all these factors requires an understanding of the way in which impurities are held in the ice. This paper discusses all these items, concentrating on processes in solid ice, and in firn below the top meter or two. Data from Dolleman I. are included.

F-55834

Van Ommen, T., Morgan, V., **Peroxide record from the DSS ice core, Law Dome, Antarctica: preliminary results,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.623-627, 11 refs.

DLC QC879.6.C45 1996

The Law Dome site, and in particular the Dome Summit South (DSS) ice core, offer distinct features which may well shed light on the difficult issue of the atmosphere/ice relationship. The DSS site is located 4.6 km SSW of the summit of Law Dome in Wilkes Land. The core was drilled over successive summers from 1988-89 to 1992-93 when drilling reached silty ice near the base of the ice sheet, 1200 m below surface (mbs) and provides a record which extends back in time beyond the last glacial maximum (LGM). The preservation of seasonal cycles in $\delta^{18}O$ and H_2O_2 in the DSS core permits accurate dating by layer counting through most of the Holocene period.

F-55868

Wadhams, P., **Sea ice morphology,** Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 46p. + figs., Refs. p.36-43.

This lecture reviews the current state of knowledge of the statistical properties of sea ice morphology, and of sea ice thickness variability in the Arctic and Antarctic. The authors examine to what extent measurements made to date provide evidence for the impact of climate change. (Auth. mod.)

F-55869

Nagurnyĭ, A.P., **Atmosphere/sea ice interaction in global climate models: a review,** Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 31p. + appends., 76 refs.

This paper models the climatic system, and contains well formalized models of the oceans and sea ice. A further development of the models of the system atmosphere-ocean-ice can be related to the improvement of the parameterization of snow and sea ice cover. A way has been found to create so-called interactive models in the framework of which the models of the evolution of sea and continental ice are realized in great detail, for example, of three-dimensional models of sea ice and snow cover. (Auth. mod.)

F-55873

Squire, V.A., **Marginal ice zone,** Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 70p., Refs. p.28-31.

Presented here are areas which have benefitted from sustained attack on marginal ice zones (MIZs), made possible by the prophetism and generosity of various funding agencies: MIZ mesoscale oceanography, including meanders, eddies, ice edge jets and upwelling; large-scale hydrographic structure; wave-ice interaction, including both theoretical and experimental studies into how the waves affect the ice and how the ice affects the waves; meteorological research into modification of the atmospheric boundary layer by changes in surface topography and surface temperature; and sea ice physical properties and morphology, including growth mechanisms and distribution and internal ice stress in relation to modeling.

F-55916

Peel, D.A., Mulvaney, R., Pasteur, E.C., Chenery, C., **Climate changes in the Atlantic sector of Antarctica over the past 500 years from ice-core and other evidence,** Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.243-262, Refs. p.260-262.

DLC QC884.C59 1996

Evidence from ice cores, borehole temperatures, early expeditions and glacier margins is used to identify the major climate trends of the past 500 years in the Antarctic Peninsula region. Apparent conflicts among the different data sources are exposed and causes discussed. Ice-core records from areas influenced by the Weddell Sea appear to be strongly sensitive to ice-edge effects, which can be detected in the profiles of deuterium excess and methane sulphonic acid. The various data now appear to be consistent with a scenario where conditions during the mid-19th century to 1940s period was fairly cool until the onset of the recent extensive warming in the post-1940s period. The coldest period of the past 300 years appears to have occurred around 1760-1780, associated with strong disturbances in the atmospheric circulation in the Weddell Sea region. This may be contemporaneous with a rather stronger cold anomaly previously observed at Law Dome and suggested for ice cores recovered elsewhere in East Antarctica. (Auth.)

F-55917

Mosley-Thompson, E., **Holocene climate changes recorded in an East Antarctica ice core,** Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.263-279, 22 refs.

DLC QC884.C59 1996

Records from the Antarctic Peninsula indicate a strong 20th century warming in which the high plateau of East Antarctica has not participated. Similarly, a recent Neoglacial cooling was prominent in East Antarctica, but absent in the Peninsula region. A new history of oxygen isotopic ratios (δ^{18}O) and atmospheric dust concentrations from central East Antarctica suggest that the high inland plateau has been dominated by a cooling trend for the last 4000 years. Superimposed upon this isotopically-inferred cooling were a number of warmer events, the largest and most persistent of which occurred ≈3600 yr. BP and lasted several centuries. The most prominent event was a prolonged cold phase around 2200 yr BP which is correlative with a mid-Neoglacial advance on South Georgia. Most intriguing are several shorter-term (multi-centennial scale) δ^{18}O oscillations which are similar in magnitude to the glacial-interglacial transition in antarctic ice cores. Although it is impossible to discount the effect of wind scouring and re-deposition in this low snow accumulation region, this 4000-year history raises important questions about the climate history on the high inland plateau during the last half of the Holocene. (Auth. mod.)

F-55918

Robock, A., Free, M.P., **Volcanic record in ice cores for the past 2000 years,** Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.533-546, 23 refs.

DLC QC884.C59 1996

Although it has been possible to construct a new index of global volcanism using ice core acidity and sulphate records for the period from 1850 to the present, for the 2000 year period there are fewer ice cores available, and dating problems become more serious, especially for antarctic cores. The authors have compared all the ice cores available for the past 2000 years with the Dust Veil Index (DVI) and the Volcanic Explosivity Index (VEI) for this period. An Ice core-Volcanic Index constructed for the period 453 A.D. to the present shows little agreement with the DVI or VEI. Except for a very few eruptions, the ice core record currently available is insufficient to delineate the climatic forcing by explosive volcanic eruptions before ca. 1200 for the Northern Hemisphere and before ca. 1850 for the Southern Hemisphere. Additional ice cores, however, combined with geological and biological information, should allow this to be done in the future. (Auth.)

F-55923

Wilson, G.S., **Neogene East Antarctic ice sheet: a dynamic or stable feature?,** *Quaternary Science Reviews,* 1995, Vol.14, p.101-123, Refs. p.119-123.

This paper is a review of the history and behavior of the East Antarctic ice sheet during the late Neogene. The antarctic ice sheet is a critical factor in the global climate and oceanographic system. Knowledge of its historical development is critical to understanding global palaeoceanographic and palaeoclimatic systems and their development. The 'Webb-Harwood hypothesis' proposes that the ice sheet, while being present in Antarctica for more than 40 Ma was until recently (ca. 2.5 Ma) a dynamic feature, waxing and waning under a more temperate climatic and glaciologic regime. The 'stabilistic hypothesis' proposes that the current ice sheet has existed in its present cold and polar form for at least the last 14 Ma. Several issues are highlighted here as important for direction of future research and discussion concerning Late Cenozoic antarctic glacio-climatic history. (Auth. mod.)

F-55939

Ackley, S.F., **Sea ice,** Encyclopedia of Applied Physics. Vol.17, New York, VCH Publishers, Inc., [1996], p.81-103, 15 refs.

The properties of sea ice are sensitive to the growth conditions and, after formation of the initial ice cover, its thermal and dynamic history. These conditions are both spatially and temporally variable, leading to significant differences in sea-ice behavior from location to location and season to season. The theme of this entry is to develop the relationship between these processes and the resulting ice properties and ice distribution, and then review how the sea ice interacts with the geophysical and biological environments. (Auth. mod.)

F-55940

Gow, A.J., **Validation of Weertman's theory of basal moraine formation by bottom freezing beneath polar ice sheets,** Johannes Weertman Symposium. Edited by R.J. Arsenault et al, 1995, p.331-335, 14 refs.

Weertman postulated on theoretical grounds that wet-bottomed ice sheets could, by refreezing of basal meltwater generated by geothermal and frictional heating, incorporate debris from the underlying bed. This "freeze-in" of basal moraine was offered as an alternative mechanism to that of "shearing-in" to explain the origin of so-called shear moraines at the margin of the Greenland Ice Sheet. A viable test of Weertman's "freeze-in" hypothesis came several years later with the successful drilling to bedrock of the Antarctic Ice Sheet at Byrd Station. The nature and disposition of this basal moraine, together with stable isotope and entrapped gas analyses of the enclosing ice, are consistent only with a "freeze-in" mechanism as first postulated by Weertman. Formation of debris-laden ice in cores from the bottom of the Greenland Ice Sheet at Camp Century has also been attributed to freeze-in of bed sediment, further reinforcing the notion that it is likely the predominant mechanism of basal moraine formation in ice sheets at their pressure melting points. (Auth. mod.)

F-55947

Baeza, A., Del Rio, L.M., Jiminez, A., Miro, C., Navarro, E., Paniagua, J.M., **Recent evolution of the overall radioactive levels in the ice of Livingston Island (Antarctica),** *Applied radiation and isotopes,* Aug. 1996, 47(8), p.811-819, 27 refs.

A study of the physico-chemical characteristics of the different layers of ice to a depth of 8.32 m in the Hurd glacier was conducted on Livingston I. in the South Shetland archipelago. No dependence on depth was observed for the pH, dry residue, or the concentrations of Ca^{2+}, Mg^{2+}, and K^{+} ions. The only dependence observed was a systematic increase in density from 0.5 to 0.85 g/cm^3 due to the greater compaction of the deeper layers. The mean annual mass balance was determined by two methods: localization of the ashes emitted by a volcano on Deception I. and by means of a ^{210}Pb dating method. The result in both cases was a value of 0.24 $kg/m^2/yr$, which allowed dating of different layers of ice sampled. The mean annual ^{210}Pb fallout was determined to be 1.9 $Bq/m^2/yr$. While no systematic variations in total β activity were observed with depth, they were observed for total α and residual β activities in the said ice layers. (Auth. mod.)

F-55956

Kovacs, A., **Sea ice: Part I. Bulk salinity versus ice floe thickness,** *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* June 1996, 16p., ADA-312 027, Refs. p.13-16.

Mathematical expressions have been established for estimating the bulk salinity of Arctic and antarctic sea ice vs. ice floe thickness. The ice salinity vs. thickness relationships are based on data for over 400 sea ice cores compiled from numerous sources. The results show that the bulk salinity of first-year sea ice decreases in an exponential trend with ice sheet thickness. A similar trend reoccurs as the winter ice passes through the melt season. The expression for the bulk salinity S_B in per mill for first-year sea ice from 10 to 200 cm thick is $S_B=4.606 + 91.603/T_F$, where T_F is the ice floe thickness in centimeters.

F-55957

Perovich, D.K., **Optical properties of sea ice,** *U.S. Army Cold Regions Research and Engineering Laboratory. Monograph,* May 1996, 25p., ADA-310 586, Refs. p.21-23.

Sea ice is a translucent material with an intricate structure and complex optical properties. Understanding the reflection, absorption, and transmission of shortwave radiation by sea ice is important to a diverse array of scientific problems, including those in ice thermodynamics and polar climatology. Radiative transfer in sea ice is a combination of absorption and scattering. Differences in the magnitude of sea ice optical properties are due primarily to differences in scattering. Spectral variations are mainly a result of absorption. Changes in such optical properties as the albedo, reflectance, transmittance, and extinction coefficient are directly related to changes in the state and structure of the ice. Physical changes that enhance scattering, such as the formation of air bubbles due to brine drainage, result in larger albedos and extinction coefficients. The albedo is quite sensitive to the surface state. If the ice has a snow cover, albedos are large. In contrast, the presence of liquid water on a bare ice surface causes a decrease of albedo, which is more pronounced at longer wavelenghs. Sea-ice optical properties depend on the volume of brine and air and on how the brine and air are distributed.

F-55992

Langhorne, P.J., Haskell, T.G., **Acoustic emission during fatigue experiments on first year sea ice,** *Cold regions science and technology,* July 1996, 24(3), p.237-250, 45 refs.

Acoustic emission events were measured during the cyclic loading of cantilever beams of sea ice sampled from Scott Base, McMurdo Sound. The events were detected with resonant transducers which are predominantly sensitive to the vertically polarized component of the Rayleigh surface wave. This confinement to the surface, along with the linear geometry of the beam, make it possible to estimate a one dimensional source location with only two transducers. The authors define an event magnitude and find this increases as the load increases, with the largest energy release occurring during the fracture of the beam. The measurement of magnitude requires an estimate of the high frequency attenuation of the Rayleigh waves in sea ice. The sources of the events are precursors to the eventual fracture of the sea ice, having highest density at the location of the final failure of the beam. The emissions may originate either from dislocation breakaway or the microcracking associated with this dislocation motion. (Auth. mod.)

F-56003

SCAR Steering Committee, **Role of the Antarctic in global change: an international plan for a regional research programme,** Cambridge, U.K., Scientific Committee on Antarctic Research (SCAR), 1993, 54p., Prepared by the SCAR Steering Committee for the IGBP in Aug. 1992. 9 refs.

This document follows one published by the ICSU Press and SCAR in 1989 entitled "The Role of Antarctica in Global Change". In that earlier document the reasons for conducting global change research in Antarctica were outlined in general terms. The present document provides a blueprint for action and is based on the deliberations at a SCAR-sponsored workshop which took place at the Alfred Wegener Institute in Bremerhaven, Germany, Sep. 18-21, 1991. The concept of "core" projects and regional networks was adopted in the design of the global change research program for Antarctica, outlined in this report. Six core projects were identified, which are discussed in detail: the antarctic sea-ice zone: interactions and feedbacks within the global geosphere-biosphere system; global palaeoenvironmental records from the antarctic ice sheet and marine and land sediments; the mass balance of the antarctic ice sheet and sea level; antarctic stratospheric ozone, tropospheric chemistry, and the effects of UV on the biosphere; the role of the antarctic in biogeochemical cycles and exchanges: atmosphere and ocean; and environmental monitoring and detection of global change in Antarctica.

F-56005

Worby, T., **Sea ice thickness observations from East Antarctica,** *Bureau of Meteorology Research Center. BMRC research report,* 1994, No.42, p.55-58, 4 refs.

Between Oct. 1986 and May 1993 ship-based sea ice observations were kept on 17 voyages in the area of East Antarctica. To examine regional and seasonal differences in ice conditions the authors have divided the data into 3 sectors: I (60-90°E), II (90-120°E) and III (120-150°E), and further subdivided these sectors into 5 zones between the ice edge and the antarctic continent. These zones are 0-50 km, 50-150 km, 150-350 km, 350-550 km and >550 km from the ice edge. They have also simplified the ship-based observations into 4 thickness categories based on important phases in the ice growth cycle. The extremes of ice thickness found within the antarctic pack are important for different reasons. Thin ice (<0.3 m) is crucial to the exchange of heat between the ocean and atmosphere and thick ice (>1 m) contains the bulk of the ice mass within the pack. The area-averaged ice thickness has been calculated for the undeformed and ridged component of the pack which typically comprises 70-80% of the total area in each sector.

F-56006

Warrenfeltz, L., **Guide to environmental services,** Washington, D.C., National Ice Center, 1995, var. p.

This handbook provides a brief overview of the environmental conditions typical of the Arctic and Antarctica, and an in-depth summary of the products and services available from the National Ice Center (NIC). Information regarding the availability of meteorological and oceanographic (METOC) products for the polar regions from Commander, Naval Meteorology and Oceanography Command (CNMOC) regional forecast centers is also included. The topics covered by this publication include: a brief description of the polar marine environment; a discussion of sea ice and its stages of development; an overview of the data sources incorporated into NIC products; and an overview of environmental products and services available from NIC, complimentary products from CNMOC regional forecast centers, products and services, request procedures, and dissemination means.

F-56037

Abyzov, S.S., Lipenkov, V.IA., Bobin, N.E., Kudriashov, B.B., Pashkevich, V.M., **Characteristics of different strata of the central Antarctic glacier in connection with microbiological studies** [Kharakteristika razlichnykh sloev lednika tsentral'noĭ Antarktidy v sviazi s mikrobiologicheskimi issledovaniami], *Antarktika,* 1993, No.32, p.188-194, In Russian with English summary. 31 refs.

The results of microbiological studies of ice cores removed from the deep strata of the central antarctic glacier are presented. These show that the number of viable micro-organisms in a state of anabiosis is extremely low in strata more than 150 thousand years old. Special glaciological studies on the cores show an extreme solidity of the glacial monolith in the deep strata preventing the penetration of alien microparticles or drilling fluid. (Auth.)

F-56040

Sukhorukov, K.K., **Variability of internal stresses in typical local ice cover inhomogeneities,** *Russian meteorology and hydrology,* 1995, No.10, p.38-48, Translated from Meteorologiia i gidrologiia. 13 refs.

Field measurements performed under various conditions in both the Arctic and Antarctic were used to determine the structure of internal normal stresses in typical local ice cover inhomogeneities: crack boundaries, topographic inhomogeneities, violations of isostatic balance, and temperature differences. (Auth. mod.)

F-56043

Nishida, K., Narita, H., **Three-dimensional observations of ice crystal characteristics in polar ice sheets,** *Journal of geophysical research,* Sep. 27, 1996, 101(D16), p.21,311-21,317, 11 refs.

In ice core studies, mean crystal size is generally measured on a section image of an ice specimen. However, an ice crystal with a complex shape may appear as several cells on a section image; consequently, the mean crystal size may be underestimated by overcounting the crystals on the image. The authors examined this phenomenon, called the duplication effect, through three-dimensional observation of crystal shapes. The frequency in which duplicate cells appear on a section image is linear with respect to the frequency of which randomly drawn lines on the image pass a cell more than once. On the basis of this empirical relationship, the error on the mean crystal size caused by the duplication effect can be revised from the section image itself. They also examined crystal sizes in some antarctic ice specimens. The extent of change of crystal size steadily increased with depth up to 100 m and then fluctuated between 6 and 10% in the deeper parts. (Auth. mod.)

F-56045

Kottmeier, C., Sellmann, L., **Atmospheric and oceanic forcing of Weddell Sea ice motion,** *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,809-20,824, 23 refs.

The data from sea ice buoys are uniformly analyzed by objective methods. Geostrophic winds are derived after matching of the buoy pressure data with the surface pressure fields of the European Centre for Medium Range Weather Forecasts. The ratio between ice drift and geostrophic wind speeds is reduced when winds and currents oppose each other, when the atmospheric surface layer is stably stratified, and when the ice is under pressure near coasts. Far from coasts, speed ratios, which presumably reflect internal stress variations in the ice cover, are independent of drift divergence on the spatial scale of 100 km. To study basin-scale ice dynamics, all ice drift data are related to the geostrophic winds based on the complex linear model for daily averaged data. In the southwestern Weddell Sea the mean ice drift speed is reduced to less than 0.5% of the geostrophic wind speed and increases rather continuously to 1.5% in the northern, central, and eastern Weddell Sea. The linear model accounts for less than 50% of the total variance of drift speeds in the southwestern Weddell Sea and up to 80% in the northern and eastern Weddell Sea. (Auth. mod.)

F-56048

Smith, A.M., **Ice shelf basal melting at the grounding line, measured from seismic observations,** *Journal of geophysical research,* Oct. 15, 1996, 101(C10), p.22,749-22,755, 35 refs.

Analysis of seismic data provides a new technique to measure basal melting of an ice shelf close to the grounding line. Internal reflections have been observed within the ice on a seismic reflection profile at the grounding line of Ronne Ice Shelf. The changes in ice thickness above and below these reflections have been used in a steady state model to calculate the basal mass flux of the ice shelf soon after the ice begins to float. Strain rates within the ice, calculated during the modeling, agree with values from nearby survey data. The calculated melt rates range between 0 and 7 m/yr with an estimated standard error of ±2.4 m/yr, in reasonable agreement with earlier estimates based on surface glaciological observations. (Auth. mod.)

F-56059

Nomura, A., **Global sea ice concentration data set for use with the ECMWF Re-analysis system,** European Centre for Medium-range Weather Forecasts. Technical report. Re-analysis project No.76, Berkshire, Mar. 1995, 25p., 20 refs.

The global sea ice concentration data set used in the European Centre for Medium-Range Weather Forecasts Re-Analysis system is described. This data set consists of weekly global sea ice concentration data from Nov. 1978 to Dec. 1991. The original data used in the calculations were created from satellite multichannel microwave radiometer data. Because many erroneous data were included in the original sea ice concentration data, a quality control process was carried out to remove them. To fix the sea ice limit to be used as a sea ice mask in the numerical prediction model, the sea ice data were compared with manual analyses over the Baltic Sea and the Sea of Okhotsk, and a sea ice concentration of 55% was found for the best criterion. The satellite sea ice data showed some interesting features: the seasonal change characteristic of sea ice coverage is different between the Arctic and the Antarctic. The annual mean sea ice extent was almost constant for the Antarctic but it showed a slight decrease for the Arctic. In spite of small interannual variations of total sea ice extent, large variations were observed in local sea ice coverage. (Auth. mod.)

F-56063

Oerter, H., ed, **Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995),** Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, 128p., Refs. passim. For individual papers see F-56064 through F-56076, F-56078, F-56079, F-56081 through F-56087, G-56080, J-56077 or 51-744 through 51-767.

DLC G890.F55.R47

This report contains 24 written summaries of 30 talks presented at the 10th International Workshop of the Filchner-Ronne Ice Shelf Programme (FRISP). The meeting was held at Leipzig, Germany, on June 11-14, 1995. The papers collected in this volume present an overview of FRISP and of the cooperation of participating groups. ERS-1 data, used for the determination of special surface features and ice velocities, are included in the report. The ice-shelf ocean interaction is one of the major topics, including field investigations and modelling, with seismic measurements and airborne radio echo sounding data discussed and illustrated.

F-56064

Bombosch, A., **Ice-ocean interactions in front of Filchner-Ronne Ice Shelf,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.11-13, 5 refs.

DLC G890.F55.R47

Interactions between ice and ocean have a major impact on the south polar ocean system. Over the large shelf areas of the antarctic continent, freezing of ocean water leads to salt rejection into the water. Higher saline shelf water is formed which later may contribute to the Antarctic Bottom Water formation and subsequently to the thermohaline circulations of the global ocean system. The area beneath and in front of Filchner-Ronne Ice Shelf seems to play an important role within the global ocean system. A numerical model is presented which focuses especially on underwater ice platelet-ocean interactions in front of Filchner-Ronne Ice Shelf. The one dimensional model is based on the conservation of mass and momentum. It is suggested that the oceanographic conditions within the water do not change and that the ice crystal-ocean system keeps in a dynamic equilibrium.

F-56065

Corr, H., Popple, M., Robinson, A., **Airborne radio echo investigations of a marine ice body,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.14-17, 10 refs.

DLC G890.F55.R47

During the antarctic 1994-95 field season 8 dedicated airborne radio echo flights were flown from remote field camps over the western side of the Ronne Ice Shelf and its tributary ice streams. This paper deals with processed data from just one of these flights, labelled as Flight 13 in a figure. The existence of a large body of marine ice between the Evans and Rutford ice streams has been confirmed by direct measurements. The necessary oceanographic conditions for the deposition of this marine ice are discussed. The accretion mechanism for the low salinity marine ice found in the B13 ice core is thought to be by the accumulation of ice platelets. However, examination of the PRC at the meteoric-marine ice interface shows a high conductivity linear feature. A high conductivity at the interface suggest a salinity of the marine ice that is more appropriate for sea ice. A possible accretion mechanism would then be the congelation of sea ice at the ice-water interface.

F-56066

Gerland, S., **Borehole logging of physical ice properties on Berkner Island, Antarctica: preliminary results,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.18-22, 4 refs.

DLC G890.F55.R47

Knowledge about physical properties of ice is crucial for the understanding of environmental and precipitation conditions in the past. Physical property logs enable stratigraphy studies as well as dating. Usually, logs from ice caps were obtained from core measurements after drillings. This study shows borehole logging with a newly designed borehole probe as a complement to core measurements. One of the major advantages of such borehole measurements is the possibility of filling gaps in data profiles from core measurements due to broken or non-recovered core material; furthermore, borehole logs contain a different, non-interrupted independent depth scale without gaps. Distorting effects from coring on core material are not present. Borehole measurements are relatively fast and enable physical property determination *in-situ*. Borehole measurements were performed at the south dome (Thyssenhöle) of Berkner I. during the antarctic field season 1994-95.

F-56067
Grosfeld, K., Determann, J., Gerdes, R., **Interaction between ice-shelf cavities and the open ocean,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.23-30, 16 refs.
DLC G890.F55.R47

A 3D-Ocean Global Circulation Model was applied to an idealized ice shelf-ocean domain, where the ice-shelf cavity is coupled to the adjacent open ocean at a topographic barrier, the ice-shelf edge. Different experiments with changing ice-thickness distributions and sea-bottom topographies were performed to investigate the water-mass interaction process between the ice-shelf cavity and the open ocean. The simulations show, that the interaction of ice-shelf cavities and the adjacent open ocean depends very much on the bathymetry and distribution of the ice-shelf thickness. These results are consistent with observations that the main interaction between the Filchner-Ronne Ice shelf system and the adjacent open ocean is limited to the deep depressions in the west and east.

F-56068
Hempel, L., Oerter, H., **Airborne radio echo sounding during the Filchner V field season,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.31-38, 3 refs.
DLC G890.F55.R47

To calculate the mass balance of the Filchner-Ronne Ice Shelf, besides parameters, like flow velocity and deformation rates, very accurate data about the thicknesses of the ice streams flowing from the inner part of Antarctica into the ice shelf are also required. These data can be acquired with the new radio echo sounder onboard the aircraft “Polar 2”. With this equipment it is possible to map ice thickness and internal layering down to 3.5 km depth at a horizontal trace distance of about 3 m and a vertical resolution of 10 to 20 m. During the Filchner V campaign the areas of investigations were located at the grounding line between Foundation Ice Stream and Institute Ice Stream and along the flow lines of the central Ronne Ice Shelf and perpendicular to these. In total 43.5 h of flying time yielded about 10,000 km of data profiles.

F-56069
Ihde, J., Schirmer, U., Stefani, F., **Approximation of ice sheet from ERS-1 radar altimeter in the Filchner Ronne Ice Shelf,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.39-42, 11 refs.
DLC G890.F55.R47

With the help of satellite radar altimetry it is possible to cover the geometry of the surface of the Earth with high accuracy. For the radar altimeter of ERS-1, accuracies of a few centimeters were shown for the ocean areas and 1-2 decimeters for the flat ice sheets of Antarctica with the resolution of 5-10 km. These are the prerequisites for investigations of interaction of long-term changes of sea-level and ice heights. The long term goals of the investigations with satellite radar altimeter data are ice mass balance investigations of the antarctic continent. The results of this project show a high potential of ERS-1 radar altimeter precision over flat ice sheets.

F-56070
Johnson, M., **Spot depth seismics over the southern and western Ronne Ice Shelf,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.43-45, 3 refs.
DLC G890.F55.R47

During the 1994-95 field season 152 seismic measurements of the ice- and water-column thickness were made at 15 km intervals along a 2300 km traverse. This zig-zag traverse covered the southern and western Ronne Ice Shelf and the Evans Ice Stream. The objective was to record primary reflections from the ice- and sea-bed from which the two-way-travel (TWT) times to these interfaces may be picked clearly. Long record lengths, up to two and a half seconds, were used to record both the primary reflections and any of the weaker multiples that might be detected and used to aid the interpretation of the records. The topography map shows the preliminary seabed depths contoured at 100 m intervals over the area covered by the traverse. Although the results conform to the general trends estimated by Vaughan et al 1995 for the “Map of Subglacial and Seabed Topography”, there are significant variations from this conception, which are described.

F-56071
Jonas, M., **Analysis of glaciological features on Filchner-Ronne-Schelfeis based on Landsat and ERS-1 SAR image data,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.46-49, 3 refs.
DLC G890.F55.R47

The classification of surface features from remote sensing image data is part of the ESAMCA project (Exploitation of satellite altimetry for the monitoring of climate-related change of antarctic ice shelves), where the surface topography of Filchner-Ronne Ice Shelf is further investigated from ERS-1 radar altimetry and image data. Geo-referenced Landsat MSS (Multispectral Scanner) and ERS-1 SAR (Synthetic Aperture Radar) images are processed and interpreted with a digital image processing system. Some special influences of Berkner I. on the flow conditions and mass balance of the ice shelf are expressed by topographic structures. The influences discernable in the remote sensing data, which are different on Filchner-Ronne Ice Shelf, are discussed.

F-56072
Lambrecht, A., Nixdorf, U., Zürn, W., **Ablation rates under the Ekström Ice Shelf deduced from different methods,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.50-56, 3 refs.
DLC G890.F55.R47

The behavior of ice shelves plays an important role for the mass balance of the antarctic ice sheet as the outflow of the inland ice is hindered by the ice shelves. The interaction with the ocean influences the mass balance directly by accumulation or ablation processes and gives rise to water masses that fill the deep ocean. These cold water masses are of great importance in regard to the role of the oceans as heat storage in the global change context. The ablation rates for the Ekström Ice Shelf deduced from different methods are in very good agreement. By extrapolation of the temperature profile to the pressure melting point, an ablation rate of 65 cm/a was deduced for the time between May 1993 and June 1994. The comparison of the measured temperature profile of July 13, 1994 with theoretical calculated temperature profiles yields an ablation rate of 90 cm/a.

F-56073
Mayer, C., Lambrecht, A., Oerter, H., **Glaciological investigations on the Foundation Ice Stream,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.57-63, 3 refs.
DLC G890.F55.R47

The oversnow traverse to the grounding line area of the Foundation Ice Stream in the 1994-95 field season continues earlier work on the central part of the Filchner-Ronne Ice Shelf. This area, together with the entrance area of the Möller Ice Stream, regulates the entire ice flow between Berkner I. and Henry Ice Rise and on to the ice front near the German Filchner Station. For a better understanding of the mass transport on this part of the ice shelf, detailed measurements have been taken along a flow line of the Foundation Ice Stream. Using geophysical and glaciological methods, the mass balance within the transition zone has been determined; a geodetic group carried out the velocity and deformation measurements. Together with accumulation and temperature data from firn cores drilled along the flow line it is planned to reconstruct the deposition and transportation history of the ice mass throughout the ice shelf.

F-56074
Miners, W.D., Mulvaney, R., **Electrical logging and initial dating of ice cores from Berkner 94/95,** Filchner-Ronne Ice Shelf

Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.64-66, 2 refs.

DLC G890.F55.R47

Using a recently built electrical bench the ice cores retrieved from the boreholes on the North Dome (R1) and the South Dome (B25) of Berkner I. were logged in the field. For each core, records were made of stratigraphy, ECM (Electrical Conductance Measurement, measures acid content) and DEP (Dielectric profiling, which responds to acid, ammonium and chloride). Results are tabulated and discussed.

F-56075

Minikin, A., Graf, W., Wagenbach, D., Oerter, H., **2000 year record of biogenic sulfur, sea salt and nitrate from the central Filchner-Ronne Ice Shelf,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.67-73, 8 refs.

DLC G890.F55.R47

During the 1991-92 field season a 320 m deep ice core, B15, was recovered from the central Filchner-Ronne Ice Shelf at the location D236 about 180 km from the shelf ice front. The drill site was chosen on a flow line originating most probably from the Möller Ice Stream and passing north of B15 through the former drill site B13. The drilling reached the marine shelf ice layer at a depth of 153 m. This study deals with chemical analyses on the upper, the meteoric part of the B15 core. The main objective is to try to reconstruct the paleo-environmental conditions in the Weddell Sea region over the last one or two thousand years.

F-56076

Mulvaney, R., **Berkner Island Ice Core Project: report and some initial results,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.74-79, 5 refs.

DLC G890.F55.R47

The objective of the Berkner Island Ice Core Project is to reconstruct a high resolution record of climate and environmental change on timescales extending from centuries to several thousand years. Berkner I. lies adjacent to the Weddell Sea: ice core records from this island will help elucidate the role of the Weddell Sea in long-term climate change over West Antarctica. Such records will provide a basis for understanding the mechanisms driving both climate and coupled biogeochemical cycles, and will allow recent climate trends to be viewed in the perspective of longer term trends and variability of the climate system. The site also serves as a valuable link between existing ice core records from the Antarctic Peninsula and those from continental ice sheet locations, particularly the future planned ice core program in Queen Maud Land (EPICA).

F-56078

Nixdorf, U., Rohardt, G., Lambrecht, A., Oerter, H., **Deployment of oceanographic-glaciological strings under the Filchner-Ronne-Schelfeis in 1995,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.87-90, 5 refs.

DLC G890.F55.R47

The lower side of ice shelves is very important for mass balance studies of the antarctic ice sheet; subglacial accumulation as well as ablation result in considerable mass transformations. The melting of ice shelves plays a major role in the process of the formation of Antarctic Bottom Water (AABW) that fills the deep ocean. These processes are studied by various models. In order to verify these models by field data, accumulation and ablation as well as mass, salt and heat transport under the ice shelves were measured by deployment of two moorings under the Ronne Ice Shelf at locations with subglacial accumulation and subglacial ablation.

F-56079

Oerter, H., **German Filchner V Campaign in 1995: an overview and preliminary results from Berkner Island,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.91-96, 6 refs.

DLC G890.F55.R47

The three main topics of the 1995 German expedition to the Filchner-Ronne Ice Shelf were: interaction between ice shelf and ocean, studied by means of hot-water-drilling and oceanographic strings under the ice shelf; mass input across the grounding zone of Foundation Ice Stream and Möller Ice Stream, investigated by means of geodetic surveying, geophysical and glaciological investigations as well as air-borne radio-echo soundings for ice thickness determination; and climate history of the millennium, archived in an ice core of Berkner I. Results of this investigation are presented.

F-56081

Riedel, B., Karsten, A., Ritter, B., Niemeier, W., **Geodetic fieldwork along Foundation Ice Stream,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.101-106, 3 refs.

DLC G890.F55.R47

The registration of geometry of the grounding line and its changes with satellite and terrestrial observations was the main emphasis of the geodetic fieldwork in 1995. The examinations for the geometry contained the position (Λ, Φ, h), the height above sea level (H) and the surface topography. Changes of geometry were defined as the determination of flow velocity, strain and tidal deflection (Δh). The grounding line area (grounding zone) was reached by a SkiDoo-traverse from the Filchner station along former deformation figures following a flow line of Foundation Ice Stream to an area of 5*80 km^2 at 83° 10'S.

F-56082

Rist, M.A., Sammonds, P.R., Murrell, S.A.F., Meredith, P.G., Oerter, H., Doake, C.S.M., **Experimental fracture and mechanics of antarctic ice,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.107-110, 3 refs.

DLC G890.F55.R47

The deep-hole coring expeditions of the Alfred-Wegener Institute to the Ronne Ice Shelf in 1990 and 1992 have made available sufficient quantities of large-diameter ice core to facilitate the examination of the scale-independent fracture toughness, as well as the short-term rheology, of antarctic ice. The aim is to determine ice material properties that can be directly applied to help explain the mechanics of specific ice shelf processes such as crevasse formation and tidal flexure. Experimental methodology and preliminary fracture results are discussed.

F-56083

Sandhäger, H., **Review of the Münster airborne radio-echo sounding-data set: marine ice beneath Filchner-Schelfeis; bottom reflectivity and internal structures of Berkner Island,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.111-114, 8 refs.

DLC G890.F55.R47

In the course of a long-term project covering three field seasons, the University of Münster had carried out extensive airborne radio-echo soundings (RES) over the Filchner-Ronne Ice Shelf. The data set was reviewed, leading to three essential conclusions which are considered to be of significance for future ice dynamic and oceanographic studies as well as for investigations of the climatic history of the southern Weddell Sea.

F-56084

Smith, A.M., **Basal melting at grounding line of Rufford Ice Stream from seismic surveys,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.115-118, 8 refs.

DLC G890.F55.R47

Melting of ice from the base of ice shelves is important for two reasons: firstly, for its contribution to the mass balance of the antarctic ice sheet; and secondly for its effect in modifying the water masses of the antarctic continental shelf and the world's deep oceans. Rutford Ice Stream flows into the SW corner of the Ronne Ice Shelf. A 4 km, single-fold seismic reflection profile was acquired in Feb. 1993, which crosses the grounding line. The ice bottom reflection and its ghost are clear. A number of reflections can be seen within the ice, between 100 and 250 m above the ice base. What causes them is not clear, but possibilities are suggested which include entrained moraine or a change in the ice fabric. Whatever the cause, if the reflectors are assumed to be isochrons within the ice, and if their geometry is known, then the pattem of convergence between these reflections and the ice base will show the combined effect of basal melting and internal deformation within the ice column. A comparison is made with data from the grounded ice further upstream, where orthogonal, intersecting seismic profiles have been acquired.

F-56085

Stefani, F., Ihde, J., Schirmer, U., **Geoid determination in the Filchner Ronne Ice Shelf,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.119-122, 7 refs.

DLC G890.F55.R47

The knowledge of the geoid as a reference frame for the polar ice heights and the mean sea level is of considerable importance for understanding the interaction between climate related changes of both quantities. A new geoid in the Filchner-Ronne Ice Shelf area is determined by spectral combination of the long wavelength components from the OSU91A model with the short wavelength components from a density layer model with regional isostatic compensation. The a priori unknown degree of regionality is inferred from the comparison of calculated and measured gravity anomalies.

F-56086

Steinhage, D., Blindow, N., **First results of short pulse radio echo sounding on the top of Berkner Island,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.123-126.

DLC G890.F55.R47

Topography and ice thickness of Berkner I. have been investigated during the summers 1985-86 and 1989-90 on approximately 5,000 km of aerogeophysical flight tracks. The maximum ice thickness is just above 1,000 m, the mean ice thickness is about 780 m. In connection with the core drillings on the domes the stratigraphy in the ice is considered to be of special interest. By means of the short pulse electromagnetic reflection method (EMR), layers in the ice and the bedrock can be mapped continuously. A total depth of about 1,000 m is well in the range of the EMR-system. Operating at a center frequency of 30 MHz such a radar system achieves a relative precision in depth of about 1 m and a resolution of neighboring layers of about 2.5 m after processing.

F-56087

Nordic contributions to EPICA Dronning Maud Land (DLM) site survey (Extended abstract), Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.127-128.

DLC G890.F55.R47

This extended abstract gives an overview of the plans for the Nordic countries contribution to EPICA site survey in Queen Maud Land as they were presented at the 10th FRISP-meeting in Leipzig. The presented plans are a status per medio June 1995 and include activities for the three coming austral summer seasons, 1995-96, 1996-97 and 1997-98, respectively.

F-56116

Kang, J.C., et al, **Geochemical characteristics of snow-ice soluble impurities in King George Island Ice Cap, Antarctica,** Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.247-254, In Chinese with English summary. 12 refs.

Chemical analyses for soluble impurities of snow-ice cores from the small dome (250 m a.s.l.) and the main dome (702 m a.s.l.) of King George Island Ice Cap show that the major ions in the ice cap are Na^+, Ca^{2+}, K^+, Mg^{2+}, NH_4^+, H^+, SO_4^{2-}, NO_3^-, Cl^- and Br^-, among them, the concentration of Na^+ plus Cl^- is 5-7 times more than the total concentration of the rest ions, and Cl^-/Na^+ is similar to the ratio of sea water. It means that the soluble impurities are mainly derived from sea salt. The concentration of Na^+ or Cl^- is measured in µg/g at both the small dome and the surface layer of the main dome. The average concentration of Br^- is 10-12 ng/g, which is less then reported in other areas of the Antarctic. (Auth. mod.)

F-56117

Wen, J.H., et al, **Glaciolgical characteristics of the Collins Ice Cap, King George Island, Antarctica,** Diwujie Quanguo bingchuan dongtuxue dahui taolunji (Chinese Conference on Glaciology and Geocryology, 5th, Lanzhou, China, Aug. 18-22, 1996. Proceedings. Vol.1), Lanzhou, Gansu wenhua chubanshe (Gansu Culture Press), 1996, p.255-262, In Chinese with English summary. 24 refs.

Vertical temperature gradients in the Collins Ice Cap are about 0.67°C/100 m; the temperature jump is only 0.25°C. Precipitation on the ice cap is plentiful. In summer, most of the precipitation on the small dome is liquid, but on the main dome is solid. In winter, solid precipitation is predominant on the whole ice cap. Net accumulation of the Collins Ice Cap increases rapidly with an increase of elevation and the mean annual accumulation rate at the top of the main dome is 2,480 $kg/m^2/a$. The small dome and main dome have different mass balance features. The small dome receives most of its mass nourishment in the cold season, while the main dome is nourished all year round. Surficial melting is the main form of ablation on the small dome, but on the main dome iceberg calving is more important. (Auth. mod.)

F-56121

Stössel, A., Oberhuber, J.M., Maier-Reimer, E., **On the representation of sea ice in global ocean general circulation models,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,193-18,212, 70 refs.

The performance of the sea ice component of two ocean general circulation models (OGCMs) is investigated under quasi-identical forcing and boundary conditions and compared with the performance of a stand-alone sea ice model. The latter reproduced realistic sea ice characteristics under the same external conditions. All three sea ice models employ a viscous-plastic constitutive law to describe the variation in intemal ice stress in the momentum balance. The treatment of the sea ice component in global OGCMs is discussed in a more general context, focusing on the southem ocean, where sea ice plays a critical role in bottom water formation. These studies show that sea ice in present-day global OGCMs can be formulated with the same quality as stand-alone sea ice models designed for specific regional studies, without the sacrifice of notable extra computation time. (Auth. mod.)

F-56122

Comiso, J.C., Gordon, A.L., **Cosmonaut polynya in the southern ocean: structure and variability,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,297-18,313, 40 refs.

Along the far eastem margin of the Weddell Gyre is a persistent feature in the middle of the ice pack called the Cosmonaut polynya. A study of polynya occurrences from 1973 to 1993 reveals that since 1986 the polynya has become more active with an average size of about 7.2 x 10^4 km^2 and an average location at 52°E and 65°S. Satellite observations indicate that the polynya has recurred several times during winter in recent years with intervals ranging from a few days to a few weeks. The daily time series indictes two primary modes of formation: one that is initiated in the early winter during a storm at a site usually preceded by an embayment of the ice edge and another that occurs during midwinter often preceded by a coastal polynya event adjacent to Cape Ann. The Cosmonaut polynya region is characterized in this study by compression of the westward flowing coastal current and the eastward flowing southern edge of the Antarctic Circumpolar Current. Vertical stretching of the water column, enchancing upwelling, accelerates the injection of relatively warm salty deep water into the surface layer, inhibiting sea ice growth and causing the polynya formation. This theory appears to explain the general behavior of the polynya in terms of frequency, duration, size, and location. (Auth. mod.)

F-56133

Flower, B.P., **East Antarctic Ice Sheet development, global carbon cycling and deep water evolution in the southwest Pacific during the middle Miocene climatic transition from 16 to 12 Ma,** Santa Barbara, University of California, 1993, 248p., University Microfilms order No.94-19071, Ph.D. thesis. Refs. p.189-193.

The Middle Miocene represents a major change in state in Cenozoic antarctic climatic evolution, following the climax of Neogene warmth in the Late-Early Miocene at 16 Ma. The early stage of this climatic transition from 16 to 14.8 Ma was marked by major variations in global climates, East Antarctic Ice Sheet volume, sea level, and deep ocean circulation. Antarctic climate change was also associated with important changes in global carbon cycling and in the terrestrial biosphere. Increased aridification of mid-latitude continental regions enhanced the development of grasslands and stimulated the evolution of grazing mammals in the Early Middle Miocene. Deep ocean circulation changes probably played a major role in the evolution and variation in polar climates. Invigoration of Southern Component Water production was closely linked to antarctic cooling and major growth of the East Antarctic Ice Sheet after 14.8 Ma, representing a crucial step in the establishment of late Neogene global climate systems. (Auth. mod.)

F-56139

Vihma, T., Launiainen, J., Uotila, J., **Weddell Sea ice drift: kinematics and wind forcing,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,279-18,296, 42 refs.

Ice drift in the Weddell Sea was studied on the basis of positional and meteorological data from Argos buoys drifting in 1990-1992 and surface pressure analyses from the European Centre for Medium Range Weather Forecasts (ECMWF). The drift kinematics showed differences between the eastern and western parts of the Weddell Sea. Close to the Antarctic Peninsula, the ice drifted as an almost nonrotating uniform field at a low speed, having reduced small-scale motions with little meandering, compared to regions further to the east. Inertial motion was detected from the ice drift in areas east of 35°W and in the region of the Antarctic Circumpolar Current. The data suggest a dependency upon atmospheric stability such that stable stratification reduces the wind forcing on the drift. Ice transport through a transect crossing the Weddell Sea from the Antarctic Peninsula tip to Kapp Norwegia was estimated on the basis of the geostrophic winds, the drift's observed response to the wind, and literature-based information on ice concentration and thickness. The estimated annual mean net export in 1992-94 varied from 8,000 to 22,000 m^3/s. Most of the net export took place in winter and spring. (Auth. mod.)

F-56171

Drinkwater, M.R., Haas, C., **Snow, sea-ice and radar observations during ANT X/4: summary data report,** *Alfred-Wegener-Institut für Polar- und Meeresforschung. AWI Berichte aus dem Fachbereich Physik. Report,* July 1994, No.53, 51p., WDCA 95000010, 6 refs.

This report summarizes the main observations of the sea-ice and microwave radar shipborne programs during the Winter Weddell Gyre Study 1992 (WWGS '92). It provides a listing of these measurements at each site throughout the course of WWGS '92. Together with a report of general ice conditions, which comprises visual observations from the ships bridge and imagery of satellite-based SSM/I, AVHRR and SAR sensors, it is compiled to provide a database for scientists wanting to work in this region. The main goals of the sea-ice program during WWGS '92 were to investigate the energy- and mass-balance of antarctic sea ice in winter, to improve knowledge on sea-ice growth mechanisms and ice dynamics, and to provide surface validation data for the different shipborne and spaceborne microwave remote sensing measurements which were carried out simultaneously during the shipborne experiment. The sea-ice related program consisted of the following main components with the first three items summarized in this report: ice coring and subsequent laboratory analysis; snow and ice thickness measurements; shipborne microwave radar scatterometer measurements; ERS-1 and SSM/I surface validation measurements; shipborne passive microwave radiometer measurements; shipborne optical and thermal infrared measurements and standardized ice observations from the ship's bridge. (Auth. mod.)

F-56172

Miller, L.G., Aiken, G.R., **Effects of glacial meltwater inflows and moat freezing on mixing in an ice-covered antarctic lake as interpreted from stable isotope and tritium distributions,** *Limnology and oceanography,* July 1996, 41(5), Symposium on Regional Assessment of Freshwater Ecosystems and Climate Change in North America, Leesburg, VA, Oct. 24-26, 1994. Selected papers, p.966-976, 43 refs.

Perennially ice-covered lakes in the McMurdo Dry Valleys have risen several meters over the past two decades due to climatic warming and increased glacial meltwater inflow. To elucidate the hydrologic responses to changing climate and the effects on lake mixing processes, the authors measured the stable isotope ($\delta^{18}O$ and δD) and tritium concentrations of water and ice samples collected in the Lake Fryxell watershed from 1987 through 1990. Stable isotope enrichment resulted from evaporation in stream and moat samples and from sublimation in surface lake-ice samples. Tritium was present in deep water, suggesting that a component of bottom water was recently at the surface. During summer, melted lake ice and stream water forms the moat. Water excluded from ice formation during fall moat freezing may sink as density currents to the bottom of the lake. Seasonal lake circulation, in response to climate-driven surface inflow, is therefore responsible for the distribution of both water isotopes and dissolved solutes in Lake Fryxell. (Auth. mod.)

F-56173

Sukhorukov, K.K., **Small-scale structure of internal stresses in consolidated ice cover,** *Russian meteorology and hydrology,* 1995, No.8, p.40-47, Translated from Meteorologiia i gidrologiia. 15 refs.

Results of field measurements of internal stresses in arctic and antarctic pack ice are presented. The main features of the internal stress field structure for various ice concentrations in a small area are identified. (Auth.)

F-56217

Warrenfeltz, L.L., **National Ice Center: Navy, NOAA, USCG cooperation in global sea ice,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.53-56, 2 refs.

In 1994, the U.S. Coast Guard formally joined with Navy and NOAA to form the National Ice Center (NIC). The NIC's areas of responsibility encompass the sea ice-affected portions of the Arctic, Antarctic, Atlantic, Pacific, Baltic, the Great Lakes, Chesapeake Bay, and Delaware Bay. Their products cover spatial scales from global analyses and forecasts for the East Arctic, West Arctic, and Antarctic to specialized tactical support tailored for individual customers operating in or near the ice. Seven-day, thirty-day, and seasonal forecasts of ice edge positions are produced for planning purposes.

F-56218

Benner, D.A., Nauman, S., **Description and validation of long-range sea ice forecasting methods at the National Ice Center,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.57-62, 8 refs.

The National Ice Center (NIC) provides global sea ice, iceberg and Great Lakes ice information to U.S. military, government and commercial customers. Manpower and fiscal resources for the NIC are provided through a cooperative agreement between the Department of the Navy, NOAA and the U.S. Coast Guard. The NIC provides analog and digital ice guidance products in support of operations and climate research in the polar regions. Presented in this paper are descriptions of NIC seasonal sea ice forecasting products, procedures used in their production and the validation of past long-range ice forecasting skill.

F-56219

King, J.C., Anderson, P.S., Smith, M.C., Mobbs, S.D., **Surface energy and water balance over an antarctic ice shelf in winter,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.79-81, 9 refs.

The energy balance at the surface of the antarctic continent controls the strength of the surface temperature inversion, which, in turn, controls the low-level katabatic circulation over the ice sheets. Because of the difficulties of carrying out micrometeorological studies in Antarctica, few measurements have been made of the climatology of surface energy balance components. In this paper, the authors report measurements of the mean wintertime energy balance over an ice shelf. They also estimate the contributions of evaporation from the surface and from blowing snow to the surface mass balance at this site. The measurements were made at Halley Station between Mar. and Sep. 1991.

F-56227

Harangozo, S.A., **Impact of the semi-annual cycle on South Pacific sea ice extent in two contrasting years,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.162-167, 9 refs.

In this paper a simple hypothesis is tested that interannual alterations in ice extent arise principally through atmospheric circulation variations that control the amount of ice drift/advection and *in-situ* freezing and, in turn, that the circulation alterations are ultimately tied to amplitudinal adjustments of the semi-annual cycle. This focuses on the Bellingshausen Sea between 95 and 75°W and the eastern part of the Ross Sea between 160 and 140°W where the opposing winter ice extent anomalies in the years 1983 and 1986 were prominent.

F-56239

Washington, W.M., Meehl, G.A., Bettge, T.W., **Global simulations with 1° sea-ice and ocean model components: present and future prospects,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/10-J9/13, 10 refs. Joint paper with 6th Symposium on Global Change Studies.

At the National Center for Atmospheric Research, the authors have been conducting global climate coupled-model (atmosphere-ocean-sea ice) experiments with and without flux adjustment at the ocean surface. This climate system uses a relatively high resolution (1°, 20-level) version of the Semtner-Chervin (1988, 1992) ocean model compared to that used in most other greenhouse experiments. Details of sea ice and its interactions with the other aspects of the coupled model, are presented. The antarctic sea-ice distribution shows a large seasonal area change. Also, there are areas of greater ice thickness and concentration in the Weddell Sea and close to Antarctica.

F-56252

Stössel, A., **On the ocean's upper boundary conditions in regions influenced by sea ice,** *Physica D,* Nov. 15, 1996, 98(2-4), Annual International Conference of the Center for Nonlinear Studies, 15th, Los Alamos, NM, May 15-19, 1996. Nonlinear phenomena in ocean dynamics. Paper, p.614-624, 53 refs.

This study provides an overview of the highly nonlinear and interactive processes involved with sea ice modifying the upper boundary conditions for ocean models in both the Arctic and Antarctic. The physical representation of sea ice in present-day global climate models in comparison to regional state-of-the-art sea-ice models, the role of different external forcing fields, and various sea-ice forcing mechanisms considering the role of interactive boundary-layer processes are discussed. This discussion includes the nonlinear impact of subgrid-scale heterogeneities on the momentum forcing. Finally, the possible impact of sea ice on global ocean characteristics is discussed. (Auth. mod.)

F-56253

Chen, C.T., Ramaswamy, V., **Sensitivity of simulated global climate to perturbations in low-cloud microphysical properties. Part I: globally uniform perturbations,** *Journal of climate,* June 1996, 9(6), p.1385-1402, 47 refs.

The sensitivity of the global climate to perturbations in the microphysical properties of low clouds is investigated using a general circulation model coupled to a static mixed layer ocean with fixed cloud distributions and incorporating a new broadband parameterization for cloud radiative properties. A series of GCM experiments leads to the following results: the model's climate sensitivity is virtually independent of the sign, magnitude, and the spatial pattern of the forcings considered. Changes in moisture, tropospheric status stability, and sea ice extent govern the vertical and zonal patterns of the temperature response. The zonal surface temperature response pattern, normalized with respect to the global mean, is different for experiments with positive and negative forcings, particularly in the polar regions of both hemispheres, due to differing changes in sea ice. (Auth. mod.)

F-56285

Goodwin, I.D., **Mid to late Holocene readvance of the Law Dome ice margin, Budd Coast, East Antarctica,** *Antarctic science,* Dec. 1996, 8(4), p.395-406, Refs. p.405-406.

Glacial geological studies on the Windmill Is. and along the Budd Coast at the margin of the Law Dome indicate that the glacial extent of Law Dome has fluctuated during the Holocene. The morphology and structural geology of the present ice margin and Løken Moraines indicate that Law Dome has readvanced over part of the Windmill Is. since the culmination of the post-glacial retreat. Sedimentological and geochemical analyses show that Løken Moraines comprise reworked proglacial and coastal marine sediments and ice, which supports the morphological and structural evidence for a readvance. A chronology for the readvance is produced from relative lichenometry of Løken Moraines and coastal nunataks in conjunction with ^{14}C radiocarbon dates from the proglacial and coastal zones. The combined glaciological and geological evidence suggests that the readvance occurred after c. 4000 yr BP in response to a positive mass blance on Law Dome during the Holocene. (Auth.)

F-56292

Berger, W.H., Bickert, T., Yasuda, M.K, Wefer, G., **Reconstruction of atmospheric CO_2 from ice-core data and the deep-sea record of Ontong Java plateau: the Milankovitch chron,** *Geologische Rundschau,* Sep. 1996, 85(3), p.466-495, Refs. p.491-495.

The authors provide a reconstruction of atmospheric CO_2 from deep-sea sediments, for the past 625,000 years (Milankovitch chron). The database consists of a Milankovitch template of sea-level variation in combination with a unique data set for the deep-sea record for Ontong Java plateau in the western equatorial Pacific. Vostok Station ice-core data of Barnola et al. (1987) is re-dated. To make the reconstructions multiple regression between deep-sea data, on one hand, and ice-core CO_2 data in Antarctica, on the other are employed. The patterns of correlation suggest that the main factors controlling atmospheric CO_2 can be described as a combination of sea-level state and sea-level change. (Auth. mod.)

F-56306

Bøggild, C.E., Winther, J.G., **Newly detected ablation phenomenon in Dronning Maud Land, Antarctica,** *Denmark. Grønlands geologiske undersøgelse. Rapport,* 1995, No. 165, p.93-96, 15 refs.

Of the two ice sheets in the world, Greenland and Antarctica, only the Greenland ice sheet displays significant surface melting, since the climate in Antarctica is generally too cold for large scale melting. However, different types of melt phenomena have been observed in blue ice fields in Antarctica. The Geological Survey of Greenland was invited to participate in the Norwegian Antarctic Research Expedition 1993-94 in order to study physical melt processes in Queen Maud Land in an environment which is similar to near equilibrium areas in the high arctic regions of the Greenland ice sheet. Perhaps the first recorded subsurface melt phenomenon within clear blue ice was discovered during the 1993-94 expedition; numerical modelling shows this to be a consequence of solar radiation penetration and absorption, i.e. the 'solid-state greenhouse effect'. This discovery may contribute to the understanding of runoff from high polar regions of both the antarctic and Greenland ice sheets. (Auth. mod.)

F-56315

Markus, T., Burns, B.A., **Wind events compared with polynya area estimates derived from SSM/I data,** *EARSeL advances in remote sensing,* Dec. 1994, 3(2), p.90-99, 19 refs. For another source see 50-5596 or F-55286.

Different methods for estimating ice concentration as well as special polynya detection algorithms are applied to passive microwave data to determine the size of small microwave data to determine the size of small coastal polynyi, in the Weddell Sea region of the Antarctic for Sep. 1989. The detection algorithms use 1- and 2-dimensional polynya signature models based on generation of synthetic microwave images of polynya events, which are compared with measured microwave data of the 37 GHz vertical polarization channel. The results from all methods are compared with wind data and with calculations from a dynamic model of polynya size in a case study for a region close to Halley Bay. (Auth. mod.)

F-56338

Cavanié, A., Ezraty, R., Gohin, F., **Contributions of ERS-1 to sea ice observation on an ocean-wide scale** [Apports d'ERS-1 à l'observation des glaces de mer à l'échelle océanique], *Monaco. Institute océanographique. Mémoires,* 1994, No.18, Les nouvelles frontières de la télédétection océanique (New frontiers in ocean remote sensing), p.99-106, In French with English summary. 5 refs.

DLC GC10.4.R4N68 1994

The scatterometer, the microwave radiometer and the synthetic aperture radar, in wave mode, of the European satellite ERS-1 were primarily designed to measure met-oceanographic parameters at the sea surface. Over both polar caps these instruments provide new and complementary data to describe sea-ice. The scatterometer provides information on the nature, coverage and extent of sea ice at the polar cap scale. The microwave radiometer allows a limited but precise location of the ice edge and a description of the marginal zone, while the imagettes of the SAR permit sea-ice texture analysis over a limited area. The synergetic use of the data of these sensors during the ERS-1 and ERS-2 missions should provide new and valuable information on the sea-ice regime of both polar caps. (Auth.)

See also:

A-54490 A-55212 A-55436 A-55507 A-55888 B-54064 B-54124
B-54198 B-54258 B-54464 B-54465 B-54550 B-54582 B-54662
B-54681 B-54686 B-54788 B-54809 B-55051 B-55061 B-55191
B-55215 B-55216 B-55313 B-55333 B-55407 B-55445 B-55446
B-55447 B-55448 B-55449 B-55451 B-55452 B-55454 B-55539
B-55596 B-55658 B-55793 B-55870 B-56126 B-56290 C-55645
C-55764 C-55804 C-55805 C-55806 C-55933 C-56028 D-54588
E-54059 E-54073 E-54080 E-54095 E-54151 E-54235 E-54276
E-54277 E-54340 E-54383 E-54456 E-54632 E-54634 E-54635
E-54673 E-54674 E-54718 E-54752 E-54812 E-54912 E-54913
E-54927 E-54944 E-54947 E-55055 E-55121 E-55289 E-55290
E-55543 E-55544 E-55545 E-55546 E-55562 E-55653 E-55660
E-55680 E-55681 E-55682 E-55748 E-55883 E-55942 E-55948
E-55950 E-55997 E-56021 E-56089 E-56175 E-56246 E-56283
G-54496 G-54670 G-54737 G-54886 G-55075 G-55083 G-55148
G-55547 G-55587 G-55836 G-55929 G-56340 I-54251 I-54352
I-54392 I-54400 I-54418 I-54419 I-54448 I-54455 I-54587
I-54656 I-54790 I-54795 I-54796 I-54797 I-54798 I-54810
I-54821 I-54822 I-54898 I-55045 I-55046 I-55068 I-55078
I-55097 I-55219 I-55321 I-55365 I-55437 I-55472 I-55574
I-55584 I-55656 I-55659 I-55683 I-55711 I-55712 I-55824
I-55825 I-55826 I-55830 I-55833 I-55851 I-55852 I-55900
I-55903 I-55914 I-55915 I-55919 I-55920 I-55949 I-55951
I-55953 I-55967 I-55978 I-55983 I-55991 I-56007 I-56025
I-56042 I-56130 I-56140 I-56176 I-56194 I-56211 I-56212
I-56213 I-56220 I-56222 I-56232 I-56238 I-56307 J-54130
J-54157 J-54267 J-54271 J-54307 J-54348 J-54617 J-54762
J-54818 J-55052 J-55116 J-55117 J-55118 J-55120 J-55204
J-55232 J-55353 J-55479 J-55699 J-55854 J-55876 J-55891
J-55941 J-55977 J-56039 J-56044 J-56047 J-56077 J-56280
K-54482 K-54502 K-54761 K-54895 K-55019 K-55025 K-55076
K-55133 K-55182 K-55573 K-55702 K-56335 L-54899 L-54959
L-55881

G. LOGISTICS, EQUIPMENT & SUPPLIES

G-54047

Shiraishi, K., **Present status and considerations of East Antarctic Air Network,** *Antarctic record,* July 1995, 39(2), p.170-188, In Japanese with English summary. 16 refs.

The idea of CATSA (Cooperative Air Transportation System in Antarctica) from the 1970s was revived at the SCALOP (Standing Committee on Antarctic Logistics and Operations) Workshop in Washington, D.C., in Apr. 1995. This report gives a short historical background and the present status of the idea, with some information on present and recent air transportation by various countries. In particular, the East Antarctic Air Network is discussed with some critical points to be solved. (Auth.)

G-54233

Howard, J., **Beneath the ice—diving the final frontier,** *Explorations,* 1994, 1(1), p.4-9.

This article summarizes the factors involved in under-ice diving exploration of antarctic seas. Equipment design, diver training, safety considerations and the complexity of the antarctic marine biological environment are described.

G-54320

Basberg, B.L., Nævestad, D., Rossnes, G., **Industrial archaeology at South Georgia: methods and results,** *Polar record,* Jan. 1996, 32(180), p.51-66, Refs. p.65-66.

The former whaling stations at Grytviken, Husvik Harbour, and Stromness Harbour on South Georgia were surveyed during two expeditions by a Norwegian party investigating industrial archaeology. This paper describes the survey methods, which included photographic documentation, measurements, and mapping. Maps of the entire stations were made from photogrammetric and theodolite surveys. Detailed plans of the individual buildings were made, with each room being identified and measured. A detailed photographic survey was also undertaken. The paper then presents the main results of the survey so far, and suggests some possibilities for using the results in future research. It also describes an ongoing project on the production of a CD-ROM on the history of Husvik Harbour, of which the survey data are an important part. (Auth.)

G-54438

Chalmers, P., **Antarctic commute: CRREL searches for safe land route to South Pole,** *Engineer update,* Feb. 1996, 20(2), p.6-7.

As part of the U.S. National Science Foundation's (NSF) South Pole Redevelopment Project (SPRP), the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL) is seeking a feasible overland route from McMurdo Station to Amundsen-Scott Station at the South Pole, 700 air miles away. The proposed new station will be of modular design on stilts to permit snow to blow beneath it instead of drifting. By the current air route at a cost of $2/lb, the estimated 17 million pounds of cargo required for the rebuilding would cost at least $34 million. It is estimated that an overland route could carry two and a half times the cargo at half the cost. The first part of the route must cross the Transantarctic Mountains. Glaciers mark the passes but are subject to severe crevasse hazards. A helicopter-borne pulsed radar with its operating frequency boosted from the normal 80-100 MHz to 500 MHz has been tested for crevasse detection. Flown at 30 knots and 20 feet above the surface, it can scan a 15-meter-wide swath of snow and ice to a depth of 20 meters.

G-54495

Funaki, M., **Aircraft operation for earth science study in the Yamato Mountains by JARE 35,** *Polar news,* Aug. 1995, No.61, p.16-20, In Japanese.

Although the title implies a scientific study, this article is mainly a narrative account of the support of ground teams in the Yamato Mountains (the Japanese name, officially called Queen Fabiola Mountains) by two aircraft, a Cessna and a Pilatus, from Showa Station during the 35th Japanese Antarctic Research Expedition. There were 12 flights each, Sep.-Dec. 1994. The cost was ¥3,150,000 for the Cessna (¥70,000/hr x 3.75 hrs per flight x 12 flights) plus ¥3,360,000 for the Pilatus (¥80,000/hr x 3.5 hrs per flight x 12 flights) plus ¥195,300 consumption tax for a total of ¥6,705,300. A sketch map is included showing the landing site on the bare ice.

G-54496

Saito, T., **Dome-Fuji deep drilling facility, JARE 35,** *Polar news,* Aug. 1995, No.61, p.21-27, In Japanese.

The construction of Dome Fuji (abbreviated Dome F) Station at 77°18'S, 39°41'E, 3810 m a.s.l., completed in Nov. 1994 by a nine-man crew of the 35th Japanese Antarctic Research Expedition, is described. The station consists of a separate workshop and a living area connected by an undersnow passage to a work area. The living area includes a mess hall, observation hut, infirmary, living quarters with six rooms, a generator hut with two 24-kVA generators, and a fuel store. The work area consists of the drilling site, i.e. a trench dug in the snow 4 m deep, 4 m wide and 22 m long housing the borehole, with two access trenches and a drill workshop. Sketch plans showing the layout and dimensions are included.

G-54497

Yamagishi, H., **Installation of HF radar at Syowa Station—a personal retrospect of the project,** *Polar news,* Aug. 1995, No.61, p.47-52, In Japanese.

The installation of the antenna array and RADOPS radar control computer program for an HF Doppler auroral radar system at Showa Station, Dec. 1994-Feb. 1995, is described. The antenna array consisting of log-periodic antennas on twenty 15-m antenna towers spaced 15 m apart in two rows, one of 16 towers and the other of 4 towers, is the first part of a radar system scheduled to go into full operation in 1997. When fully operational, the radar system will be part of Super DARN (Doppler Auroral Radar Network), a worldwide network of radar stations studying the aurora in both the Arctic and Antarctic.

G-54499

Takada, K., **Relocation of telecommunication facilities at Syowa Station,** *Polar news,* Mar. 1995, No.60, p.49-52, In Japanese.

The relocation, completed in Jan. 1995, of telecommunication facilities at Showa Station, is described. The relocation included installation of VHF/UHF transceivers, an air control console, a telecommunications console, and INMARSAT (International Maritime Satellite) equipment in the communications room of the new three-story administration building, and installation of antennas and cable hookups outside. A sketch floor plan of the communications room is included.

G-54537

Parica, C.A., D'Ascanio, C., **Potable water characteristics at Esperanza Station** [Características del agua de consumo de la Base Antártica Esperanza], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.289-291, In Spanish.

DLC G845.5.J67

The quality of potable water at Esperanza Station was evaluated in Feb. 1990, with the conclusion that the water was not fit for human consumption according to the Argentine Food Code of Laws and the rules of the World Health Organization. Some recommendations are offered regarding equipment and control methods to improve the quality of the water.

G-54574

Kimura, S., **Development of a wind turbine system for Antarctica,** International Experts' Meeting on Wind Power in Icing Conditions, Helsinki, Finland, 1992. Proceedings. Boreas-North Wind-Pohjatuuli. Edited by B. Tammelin et al, Helsinki, Finnish Meteorological Institute, 1992, p.179-187, 6 refs.

DLC TJ820.B67

A new wind turbine system to be used for producing electricity and heat for the research and daily activities at an observation station in Antarctica was developed. Based on the results of the investigation of previous tests of a wind turbine in Antarctica and the analysis of meteorological data, several new concepts were derived for designing a new turbine system. These were validated by wind tunnel and low temperature tests. The wind turbine system was set up at Asuka Station in Antarctica in 1990 and a field test was started according to the prescribed test programs. (Auth. mod.)

G-54641

Stoker, C.R., Barch, D.R., Hine, B.P., III, Barry, J., **Antarctic undersea exploration using a robotic submarine with a telepresence user interface,** *IEEE expert,* Dec. 1995, 10(6), p.14-23, 10 refs.

The use of advanced telepresence and virtual reality operator interfaces has led to successful operation of remote scientific exploration vehicles. This has been evident at a recently concluded field experiment in Antarctica. In the experiment, a telepresence-controlled, remotely operated underwater vehicle has been used to study sea floor ecology. The experiment, in addition to being successful, has represented the first combined use of telepresence and virtual reality for scientific purposes. (Auth.)

G-54670

Mellor, M., Morelli, P., **Studies in applied glaciology, Antarctica, 1961-1962,** Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, July 1962, 22p. + figs.

During the antarctic summer of 1961-62 a CRREL group carried out a program of applied snow studies at New Byrd Station and at the South Pole. In the undersnow complex of New Byrd Station repeated surveys were made, and equipment for recording deformation and temperature was installed at a number of places. Foundation tests and confined compressive creep tests were conducted at both Byrd and South Pole, and some experiments on the reinforcement of cast snow (Peter snow) were made. The general aims of the project were to monitor deformation and temperature change in the undersnow camp for the benefit of the operators, to provide data for the rational design of future ice cap stations, and to extend the range of information on snow properties in the antarctic environment. Since significant deformations in the undersnow complex at New Byrd will take one or two years to develop, this report is confined to a description of the tasks accomplished together with a preliminary data presentation and brief discussion.

G-54703

Amos, A.F., **AMLR program: the underway data acquisition system,** *Antarctic journal of the United States,* 1994, 29(5), p.201-204, 2 refs.

One feature of the scientific operation of the U.S. antarctic research vessel *Eltanin* in the 1960s and 1970s was the "Daily Data Sheet", a compilation of navigation, environmental and station information. Here the author reports having developed an adaptable system of instruments, computers and software that can be used on a variety of research vessels for continuous monitoring of surface water and atmospheric conditions. The system and its results are described.

G-54723

Wills, R.H., **Using solar energy at the South Pole: photovoltaic electricity and solar heating,** Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Dec. 1988, 42p., 16 refs.

NSF (National Science Foundation) spends about $1 million each year as of 1988 in fuel for electricity generation at the Amundsen-Scott Station. This could rise to $1.3 million in the near future with the installation of new generators and the building of a new summer camp. The high cost is mainly due to fuel transport cost from McMurdo to the Pole. The cost of diesel fuel at the Pole is about $8/gallon. The equivalent cost of electricity is 80¢/kw-h. At South Pole in summer, with 24 hours of sunshine each day, little cloud, clear air and a very reflective snow surface, an average of 1200 Watts/m^2 (110 W/ft^2) of solar energy is available for five months of the year. Summer is also the time of peak electric and heating demands. Direct electricity generation using photovoltaic cells is a practical way of reducing fuel consumption. A system costing $1.4 million could generate an average of 180 kW over five months of the summer at less than 16¢/kWh and reduce fuel costs by $330,000/y. A photovoltaic power system should operate for more than 20 years with no more than routine maintenance. It could also provide a prominent platform for U.S. renewable energy usage. Direct solar heating can be used at the Pole together with conventional oil-fired furnaces to reduce summer heating fuel use by 80% while still maintaining reliable heat and comfort levels. For example, the cost of heating a new summer camp building could be reduced from $21,000 to $4,000/16 week summer season using a solar heating system costing between $20,000 and $50,000, depending on the type of collectors used. (Auth. mod.)

G-54731

ITT Antarctic Services, Inc., **Palmer Station docking facility. Conceptual engineering study,** New York, Han-Padron Associates, May 1986, var.p.

This study was made to determine the requirements for upgraded dock space at Palmer Station to accommodate the much larger supply/research/icebreaker vessel which replaces the now retired *Hero.* Five alternative concepts were considered; the recommended alternative provides for a prefabricated jack-up structure, towed to the site and jacked into position on large-diameter steel legs.

G-54737

Crockett, A.B., **Ice wharves sampling and analysis plan for ocean dumping, McMurdo Station, Antarctica,** U.S. Department of Energy and U.S. National Science Foundation. Interagency Agreement No. DPP-9102787, Washington, Nov. 1993, 11p., Unpublished manuscript. 6 refs.

A sampling and analysis plan, designed to support ocean dumping of McMurdo Station ice wharves under a U.S. Environmental Protection Agency (EPA) Ocean Dumping Permit, is described. Sampling of residual cover soil and ice will be conducted by Antarctic Support Associates (ASA) for the National Science Foundation (NSF), Office of Polar Programs (OPP). The objective of this effort is to determine whether soil and ice comprising McMurdo Station ice wharves are contaminated with hydrocarbons to a level that would not allow for ocean disposal of the ice wharf when it has reached the end of its useful life.

G-54783

Borrmann, S., Stefanutti, L., **In-situ measurements with the M-55 Geophysica stratospheric research aircraft: the airborne polar experiment,** *Ambiente antartide,* Dec. 1995, No.6, p.69-71.

Since the early nineties efforts have been under way to transform the Russian high altitude aircraft M-55 Geophysika into a flying laboratory suited for stratospheric research aimed at environmental issues such as ozone depletion, the assessment of the influence of commercial air traffic on the atmosphere and other topics concerned with upper tropospheric and lower stratospheric physics and chemistry. In 1994 the European Science Foundation approved the ESF Airborne Polar Experiment (APE) project on behalf of several European Member Organizations including the United Kingdom and Germany; the project is mainly supported by Italy in the framework of the National Program of Antarctic Research. As a result of these efforts the APE is presently being planned and prepared.

G-54844

Stearns, C.R., Weidner, G.A., Holmes, R.E., **Antarctic automatic weather stations: Austral summer 1993-1994,** *Antarctic journal of the United States,* 1994, 29(5), p.281-284, 2 refs.

The National Science Foundation's Office of Polar Programs has placed automatic weather station (AWS) units in remote areas in Antarctica in support of meteorological research, applications, and operations. The basic AWS units measure air temperature, wind speed, and wind direction at a nominal height of 3 m above the surface, and air pressure at the electronics enclosure. Some units measure relative humidity at 3 m and the air temperature difference between 3 m and 0.5 m above the surface at the time of installation. A table gives the AWS units' site name, ARGOS identification number, latitude, longitude, elevation above sea level, site start date, and WMO number for the Global Telecommunications System for AWS units in operation as of Mar. 1, 1994. A figure shows the locations of widely spaced AWS units in Antarctica; another shows the locations on Ross I. The AWS units are grouped together based on the area and are usually related to a single meteorological experiment in the area.

G-54863

Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, Aug. 29-31, 1994, **Proceedings,** [1994], 352p., Refs. passim. For individual papers see A-54877, A-54878, G-54864 through G-54867, G-54869 through G-54874, G-54881 through G-54885, H-54875, H-54876, H-54879, H-54880, I-54887, J-54868, J-54886 or 50-4268 through 50-4285.

This is a collection of 25 papers presented at the 6th Symposium on Antarctic Logistics and Operations, held Aug. 29-31, 1994 in Rome, Italy. The Symposium was conducted by the Standing Committee on Antarctic Logistics and Operations (SCALOP) of the Council of Managers of Antarctic Programs (COMNAP) in conjunction with the XXIII Meeting of the Scientific Committee on Antarctic Research (SCAR). The themes for the 6th Symposium were: use of alternative energies; environmental protection related to operational technologies; selection and management of antarctic personnel; and new developments in operations, logistics and science support.

G-54864

Smith, A.L., Harley, D.K., **Development of a mobile garage/vehicle servicing facility, Halley scientific station,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.1-11.

To support scientific operations at the British Antarctic Survey's (BAS) Halley Station on the Brunt Ice Shelf, extensive use is made of tracked vehicles. This reliance brings with it a requirement for a major facility for front line servicing and maintenance. Traditionally the requirement has been met by the provision of a surface structure which has been allowed to become buried, access to the garage being via an inclined tunnel. With the development of the 5th Halley Station and the move away from sub-surface structures in favor of a surface facility elevated on 5 m high jackable platforms, the provision of a vehicle maintenance facility had to be addressed. After a rigorous appraisal of options, a re-locatable above-surface garage/vehicle servicing facility was selected. A feasibility study was completed and a detailed performance specification prepared for the mobile garage. This resulted in a structure of sizable proportions which, when fully equipped, weighs in the region of 50 to 55 tonnes. This unit was erected on site during the summer of 1992-93. The fully self-contained facility was used extensively during the following winter and has performed well.

G-54865

El Naggar, S., Schoppe, S., **Waste management concept at the German winter station Neumayer,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.13-23.

The waste management concept at the German winter station Neumayer is discussed, showing how the requirements and recommendations of the Protocol on Environmental Protection to the Antarctic Treaty have been adopted and how they have been realized. First, the Protocol on Environmental Protection is reviewed, then the Neumayer Station is described. Details of the cleaning measures carried out before, during and after the season are given.

G-54866

Juergens, E.D., **Potential for integrated waste management in the United States Antarctic Program as a model,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.25-41.

The United States Antarctic Program (USAP) approach to waste management has recently been challenged by logistical limitations, new environmental regulations, and a renewed commitment to environmental protection. Responding to these challenges, the USAP developed one of the most aggressive waste management programs in the world. Concurrent with developing the practical aspects of this program, the USAP began to gain unique insight into the weaknesses and flaws common to most U.S. based waste management programs. Unlike the U.S. programs, the USAP has realized that effective waste management must be founded on the principal of self-sufficiency. This understanding drives the fundamentals of the USAP waste management program and is the foundation of the model concept.

G-54867

Kohnen, H., **Clean-up programme of stations of the Alfred Wegener Institute,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.43-48.

Abandoned antarctic stations have to be dismantled and removed, as long as the removal does not create a greater environmental impact than leaving the structures in place and the station is not designated a historical site. The Alfred Wegener Institute is faced with the clean-up of four stations. These include the winter station "Georg von Neumayer", abandoned in 1992 after 11 years of operations and the winter station "Georg Forster" which came under the responsibility of the Alfred Wegener Institute after the reunification of Germany; its winter operations ceased in spring 1993. Also closed are the Drescher Summer Station, which used to be a focal point of biological summer activities for penguin research and is situated at an inlet on the Riiser Larsen Ice Shelf, and two huts on Ardley I., which served until now as a base for penguin studies. The clean-up program is discussed in chronological order of the various tasks.

G-54868

Arangio, I.A., **Operation for the removal of hydrocarbons from the wreck of the Argentine polar ship A.R.A. *Bahía Paraíso*,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.49-64.

A chronological account is given of the Argentine Navy operation for hydrocarbon removal from the *Bahía Paraíso,* including background information, statistics, and activities before, during and after the operation. Thirty-five conclusions are listed, the last stating that "the wreck of Argentine Navy polar ship *Bahia Paraíso* is now clean."

G-54869

Sayers, J., **Fuel and oil usage in Antarctica,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.66-79.

Three surveys have been conducted during the last 8 years to collect information on the quantities and types of fuels and oils used by national antarctic programs in Antarctica. The surveys were as follows: 1987-88 SCAR survey of fuels and oils used by national antarctic programs; a 1990-91 COMNAP survey of the typical maximum quantities of fuels and oils carried on the vessels of national antarctic operators; and a 1992-93 SCALOP survey of the typical maximum quantities of fuels and oils carried on the vessels of national antarctic operators and tourist ships. The objectives and principal findings of each of the three surveys are described. The SCAR survey had different objectives from the latter two and consequently the data collected do not permit a comparison of trends over the period. Nevertheless, the three surveys together provide a general picture of the quantities and usage of fuels in the Antarctic Treaty area.

G-54870

Guichard, A., **Towards new energy systems for antarctic stations,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.81-95, With French summary. 24 refs.

Technologies for cleaner, renewable energy production and energy storage are rapidly evolving and new, realistic options for alternative energy systems for antarctic stations can now be considered. This paper, which originates from a co-ordinated French-Australian project, presents a review of the main station energy supply issues and a schematic presentation of selected power generation technologies and system integration options. It provides an opportunity to refocus the orientation of the project and to motivate a move towards new energy systems for antarctic stations. (Auth.)

G-54871

LeGoff, H., Hasert, U.F., Guichard, A., **Producing energy for polar stations from the wind-water temperature gradient,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.97-105, With German and French summaries. 10 refs.

The renewable resources available to produce heating and electrical power for polar stations in complement of conventional fossil fuels are reviewed. For one antarctic site (Dumont d'Urville) characterized by a standard meteorological year, the authors compare the energetic potential for solar kinetic and thermal wind sources. The exergetic productions (i.e. usable heat or mechanical/electrical power) achieved by real and optimized systems (PVs, wind generators, heat pumps, thermodynamic cycles) are compared for the site. The energy produced from the thermal dipole of the cold polar wind and the "warm" sea-, lake- or waste-water is described more precisely, as are the principles of possible combined systems (heat transformers and thermodynamical cycles). Their efficiency is assessed, computed with typical weather data for two stations: Dumont d'Urville and Krenkel, Franz Josef Land. Two experiments currently under way at both test sites consist in monitoring during two years the cooling power of the wind and in testing the heat exchangers designed to recover this kind of energy. The two experimental set-ups are described and first experimental results are presented. (Auth.)

G-54872

Sheǐnsteǐn, A.S., **Activity of Russian Committee on Antarctic Research on alternative energy sources utilization in the Antarctic,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.107-114, 12 refs.

Preliminary results of investigations carried out by Russian organizations and institutions have shown economical and ecological advantages in windmill and solar-energy-system utilization in Antarctica. A series of experimental investigations of solar heating and photovoltaic installations have been carried out at Novolazarevskaya and Molodezhnaya stations. The results of these experiments are discussed. The paper also deals with a feasibility study of hybrid power system utilization for the conditions of Vostok and Bunger Oasis stations. (Auth. mod.)

G-54873

Castellví, J., Meana, E., Castejón, A., **Alternative energy at the SAB (BAE) "Juan Carlos I",** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.115-121.

Experiments carried out with eolian energy since 1992 at the Juan Carlos I Station are mainly focused towards having an available power supply during the periods when the station is closed. During the 1992-93 campaign, two wind power generators with horizontal axis were installed, providing 3 phase a-c output of 500w, 48v. This installation obtained results during the months of Jan. and Feb. 1993 and subsequent seasons, which are described.

G-54874

Chiang, E., U.S. National Science Foundation. Office of Polar Programs, **Antarctic alternative energy summary,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.123-138.

This summary provides the following information: the United States Antarctic Program's objectives and renewable energy innovation activities; the Black Island Telecommunication Facility (BITF) location and environment; the BITF capabilities, its hybrid power system design requirements, site plan, power and equipment building, berthing building and PV arrangements; the Black I. hybrid power system block diagram and architecture; the BITF graphical computer based interface; the BITF energy production summary, with typical summer (Feb.) and typical winter (June) daily data; and five conclusions.

G-54881

Klokov, V., Lukin, V., **Concept of the cooperative air transport system in East Antarctica,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.243-263.

This paper briefly describes the main components of the local cooperative air network for the Atlantic sector of Antarctica. The main aim is to show that it is now technically feasible to establish a permanent air bridge between Africa and Antarctica, using conventional wheeled aircraft and tested methods of constructing hard runways on the ice. Data are presented which show that the internal link between stations can be provided by heavy duty helicopters.

G-54882

Mäkinen, E., Arpiainen, M., Heideman, T., **Diversity of modern antarctic vessels,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.265-290.

Logistics support and ocean research are the primary functions of typical antarctic vessels. Icebreaking capability is essential. This paper is divided in two parts; the first covers the description of six vessels, the design and/or construction of which Kvaerner Masa-Yards Inc. has been involved in. The second part covers a philosophical discussion on technical/operational requirements of future antarctic vessels and a generic concept of a future antarctic vessel optimized for desired technical functions and minimum costs.

G-54883

Lori, A., **Automatic integrated module installed at Terra Nova Bay,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.291-306.

This paper describes the status after three years of operation of an automatic platform installed at Terra Nova Bay Station during the 6th Italian expedition to Antarctica. The platform consists of two 20' standard containers and one fuel tank in a 20' standard frame. One of the containers houses the complete power generation; the other houses a central Mvax 3800 computer and additional equipment for data transmission and acquisition. The automatic platform provides the following: availability of 6 kw of electrical power (220 V AC, 50 Hz) for about one year of continuous operation; automatic data acquisition; satellite link for data transmission and telecontrol; and data transmission via HF radio. (Auth.)

G-54884

Blasi, L., De Simone, M., **Project of a regional HF high speed network among Terra Nova Bay, Dumont d'Urville and Dome C, with fax data video, voice facility,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.309-319.

The aim of this document is to describe the attempts to program a regional telecommunication network with the help of automatic adaptive systems linking Terra Nova Bay and Dumont d'Urville stations and the future base at Dome C.

G-54885

Blaisdell, G.L., **Report of the Antarctic Traverse Workshop, 2-4 May 1994, Washington, DC,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.321-322.

This workshop is the third in a series of vehicle-related specialty meetings addressing the unique needs of national antarctic programs. Sponsored by the US National Science Foundation Office of Polar Programs, it addressed long antarctic traverses. The primary focus was on heavy hauling oversnow rather than short, light traverses with a purely scientific purpose. Because of the major concern for crevasses by all who traverse the antarctic terrain, this workshop included several scientific experts who addressed modern methods for selecting safe and efficient traverse routes and the use of impulse radar for detecting bridged sub-surface voids. It became readily apparent throughout the workshop that, despite a marked advance in such areas as antarctic clothing, berthing, food, and equipment, we today have no better record of avoiding crevasses on traverse than did Hillary and Fuchs in the mid 1950s.

G-54886

Cucinotta, A., Malagoli, C., Gasparoni, F., **Installation and operation of the Italian oceanographic buoy in Terra Nova Bay polynya (Antarctica),** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.337-347, 6 refs.

An instrumented moored buoy for long-term acquisition of oceanographic and meteorological data in antarctic waters has been installed in Terra Nova Bay in an area normally free of ice, but potentially affected by drifting ice features. Its purpose is mainly to collect data on its interaction with ice conditions encountered and allow the subsequent upgrade at an operational marine observatory. The prototype station is composed of 4 main subsystems and is equipped with a limited set of sensors, mainly oriented to follow and verify the buoy dynamics and integrity. The prototype station, marine and shore operations, and the results of experimentation and data acquisition carried out to date are discussed. (Auth. mod.)

G-54926

Yoshikawa, K., **Decomposition of human excrement,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.165-170, 1 ref.

Three methods of processing human excrement used during an expedition to Patriot Hills are described. All systems used biological action and warm temperature to decompose the waste. Solar energy and human body heat were the two types of heating systems used. The solar method failed because of freezing temperatures. The body heat method was successful, but needs logistical improvement. (Auth.)

G-54977

Arcone, S.A., Tobiasson, W., Delaney, A.J., **Ground-penetrating radar investigation of the proposed dome-CARA tunnel route and utilities at South Pole Station, Antarctica,** *U.S. Army Cold Regions Research and Engineering Laboratory. Report,* Dec. 1995, 24p., ADA-306 940, 19 refs.

Ground-penetrating radar studies were performed at Amundsen-Scott Station during Jan. 1993 to determine if subsurface obstructions exist along a planned tunnel route from the main station to the new astrophysical research area on the far side of the skiway, and if various man-made subsurface features such as sewage sumps, a water well, utilidors and buried buildings could be located and delineated. The maximum depth of interest for the tunnel survey was approximately 10 m. For it, a short-pulse antenna transducer with its antenna bandwidth centered near 400 MHz was towed along the ground surface over multiple traverses to cover an area up to 60 m wide. The survey extended from the Amundsen-Scott Station fuel arch, across the skiway and then to the CARA site (Center for Astrophysical Research in Antarctica). The radar profiles show reflections from density layering within the snow caused by traffic and diffractions from artificial features within 13 m depth. Debris is present in the snow west of the skiway and near the fuel bladder near the taxiway. Targets within 100 m of the west side of the skiway are extensive, and appear to be metallic. The tunnel should be routed in the clear area north of them. Targets near the fuel bladder are only 3 to 4 m below the surface. The tunnel could go under them, but as a precaution they could be removed. An additional survey was run over a 30 m-wide swath from the ASTRO facility at the CARA site to the new elevated dormitory, a distance of approximately 800 m. (Auth. mod.)

G-55075

Kiernan, V., **Dirty oil makes a feast for soil bacteria,** *New scientist,* Jan. 20, 1996, 149(2013), p.10.

An experiment is being conducted at McMurdo Station to test the viability of soil bacteria in the biodegradation of diesel fuel spills on this site. Soil reclamation tests using this technique are now in progress.

G-55083

Dowdeswell, J.A., Powell, R.D., **Submersible remotely operated vehicles (ROVs) for investigations of the glacier-ocean-sediment interface,** *Journal of glaciology,* 1996, 42(140), p.176-183, 10 refs.

Submersible remotely operated vehicles (ROVs) are valuable research tools for data collection in dangerous or inaccessible environments associated with glaciers terminating in the sea. At tide-water ice cliffs, iceberg calving makes close approaches for extended time periods by manned vessels dangerous. ROVs can be operated from relatively safe distances (hundreds of meters); they can also descend to considerably greater depths (hundreds rather than tens of meters) than scuba diving permits. They can provide data on glacier grounding-line and sea-floor morphology and water-column characteristics (e.g. salinity, turbidity, current velocity). They are also used for diving under floating glacier tongues and ice shelves where no other access is possible. They can be fitted with a variety of oceanographic sensors, imaging sensors, tracking devices and water and sediment samplers, making them versatile research instruments that can supply qualitative and quantitative data for process studies in logistically difficult environments. (Auth.)

G-55148

Tumeo, M.A., Larson, M.K., **Movement of fuel spills in the Ross Ice Shelf,** *Antarctic journal of the United States,* 1994, 29(5), p.373-374.

Williams Field provides logistical support to McMurdo Station and manages large amounts of fuel for their cargo planes. Numerous spills have occurred at this site with little recovery or remediation of the spilled fuel. The spill which happened on Dec. 3, 1993, came from a flexible pipeline midway between McMurdo Station and Williams Field, on the Ross Ice Shelf. A fuel-line-connection failure released an estimated 11,400 L of JP-8 on the ice. Because the fuel that spilled was originally above 0°C, heat transferred into the ice and created two cone-shaped holes approximately 2 m in diameter and 4 to 5 m deep. No remediation efforts were taken, and the site was marked "off limits." Cores were taken from five holes drilled by the Polar Ice Coring Office using a 10.16 cm drill. The data collected indicate that fuel spilled on an ice shelf will travel almost straight down from the spill site with very little horizontal dispersion until a confining layer of salt-water-saturated ice is encountered. At that point, the fuel will move horizontally, spreading out on top of the salt-water-saturated layer. The fuel appears to move rather rapidly, with an estimated maximum rate of 0.8 m per day, assuming isotropic conditions.

G-55271

Ramos, M., Mora-Ray, F., Ortiz, R., **Thermal resistance of polar clothing in antarctic conditions** [Estudio de la resistencia térmica del traje polar prototipo "CM" en condiciones antárticas], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.357-363, In Spanish with English summary. 7 refs.

DLC G845.S93

A series of experiments were carried out by the 1988-89 Spanish Antarctic Expedition to measure the thermal insulation of special cold weather clothing designed by the CM company of Madrid for use in antarctic conditions. (Auth.)

G-55341

Díaz, J.I., **Antarctica and deep oceans: scientific targets for the R/V *Hesperides*,** Oceans '95 MTS/IEEE, San Diego, California, Oct. 9-12, 1995. Proceedings. Challenges of our changing global environment, Vol.1, New York, Oceans '95 MTS/IEEE, 1995, p.468-471.

The R/V *Hesperides,* commissioned in 1991, has become the flagship of the Spanish oceanographic fleet. She is an ice strengthened, multi-purpose oceanographic research vessel. For the first time, this vessel has provided the scientific community of Spain a platform fitted with permanently installed scientific instrumentation suitable for oceanographic research. The vessel is managed through the national research agency (CICYT), with a 2-year schedule programmed in advance and peer review of proposals. The *Hesperides* is a stable and low-noise platform equipped with a sophisticated navigation and controlling system. Her state-of-the-art scientific equipment allows modern research in different fields of oceanography, from physical and biological oceanography to marine geosciences and geophysics. (Auth. mod.)

G-55380

U.S. Naval Support Force Antarctica, **End of season report: Operation Deep Freeze 95/96,** May 1996, var. p.

This report describes the military support to the National Science Foundation in conjunction with the U.S. Antarctic Program. Support was provided by various organizations and commands from the Department of Defense and Department of Transportation under the operational control of Commander, U.S. Naval Support Force, Antarctica from June 1995 to Mar. 1996 as Operational DEEP FREEZE 95/96. The Naval Support Force provided command and control facilities and medical services to McMurdo Station residents and the logistic and communications pipeline for resupply of McMurdo, Amundsen-Scott, Byrd Surface Camp and other seasonal field camps, plus support for the nearby New Zealand station at Scott Base, the Italian station at Terra Nova Bay and the Russian station at Vostok. This report provides a summary of significant events during the operating period.

G-55382

Flynn, M.T., Bubenheim, D.L., Straight, C.L., **Development of an advanced life support testbed at the Amundsen-Scott South Polar Station,** *Society of Automotive Engineers. SAE technical paper series,* 1994, No.941610, 9p., Presented at the 24th International Conference on Environmental Systems and 5th European Symposium on Space Environmental Control Systems, Friedrichshafen, Germany, June 20-23, 1994. 6 refs.

This paper presents a description of the Controlled Ecological Life Support System (CELSS) Antarctic Analog Project (CAAP) and its functionality as a pilot study for the design of a future lunar-Mars habitat. A description of the prototype development testbed, located at Ames Research, is provided as well as an analysis of the key design parameters. The CAAP program is tasked with the development of a life support testbed at the Amundsen-Scott Station. This facility will include food production, waste processing, and *in situ* energy production capabilities. The testbed will provide NASA with a remote facility located in an extremely harsh environment which has been designed to provide a useful analog to the deployment of a future lunar-Martian habitat. The NSF goals are that the development of food production, water purification, waste treatment and *in situ* energy production capabilities will improve the quality of life for the Station's inhabitants, reduce logistics dependence, and minimize environmental impacts associated with human presence on the polar plateau. (Auth. mod.)

G-55383

Straight, C.L., Kohout, L., Bubenheim, D.L., Flynn, M.T., Bates, M.E., **Energy utilization concepts for the CELSS Antarctic Analog Project (CAAP),** *Society of Automotive Engineers. SAE technical paper series,* 1994, No.941353, 12p., Presented at the 24th International Conference on Environmental Systems and 5th European Symposium on Space Environmental Control Systems, Friedrichshafen, Germany, June 20-23, 1994. 33 refs.

The CELSS Antarctic Analog Project (CAAP) is being developed and deployed for operation at Amundsen Scott Station to conduct a validation of CELSS and life support techniques and approaches under severe, isolated and realistic conditions. These polar conditions are analogous to space mission scenarios, such as a Mars surface habitat or a lunar encampment mission. This paper explores methods and processes for maximizing the effectiveness and benefits of CAAP while reducing the overall energy penalty in its operation. CAAP will accomplish this through a combination of the following: the implementation and integration of high efficiency components and equipment groups; through the effective integration of CAAP with the Amundsen-Scott Station infrastructure to maximize "waste" heat utilization and the maximum extraction of useful work from that "lost" energy; and through the incorporation and utilization of *in-situ* energy resources. Estimates are reported for energy use, efficiencies and energy demand with impacts to the Station. (Auth. mod.)

G-55431

Petroleum Helicopters, Inc., **Helicopter services for the United States Antarctic Program and the New Zealand Antarctic Program,** Washington, D.C., National Science Foundation, 1996, 54p. + attachments, Contract No.OPP-9616400.

The intent of this contract is to obtain flight services utilizing fully functional aircraft equipped to meet specifications, operated and maintained by qualified personnel, for the National Science Foundation (NSF) in support of the research activities of the United States Antarctic Program (USAP) and the New Zealand Antarctic Program (NZAP). The type of services required to be performed include, but are not limited to, transportation of personnel and cargo in support of the scientific projects, related administrative and infrastructural activities and search and rescue (SAR), as directed by the NSF.

G-55505

Theno, S., Armstrong, D., **Utilities and systems for the new U.S. South Pole Station, Amundsen-Scott Station, Antarctica,** International Conference on Cold Regions Engineering, 8th, Fairbanks, AK, Aug. 12-16, 1996. Proceedings. Cold regions infrastructure: an international imperative for the 21st century. Edited by R.F. Carlson, New York, American Society of Civil Engineers, 1996, p.424-435, 5 refs.

DLC TA713.I55 1996

The U.S. has occupied the geographic South Pole continuously since 1956 with Amundsen-Scott Station. The planning and design for a third generation station is currently under way. This paper reviews the primary utility systems serving the existing facilities and discusses the systems proposed for the new station.

G-55547

Council of Managers of National Antarctic Programs, **Workshop on Antarctic Air Transport Networks,** Washington, D.C., 1995, var. p.

This publication provides a summary of the proceedings of the Workshop on Antarctic Air Transport Networks which was conducted by the Standing Committee on Antarctic Logistics and Operations (SCALOP) in Washington, D.C. from Apr. 19-21, 1995. The workshop included the presentation of seven papers on various aspects of aircraft operations including safety, financial and environmental considerations. Opportunities were provided for representatives from each country to present a summary of their current and desired air activities in Antarctica and each aircraft operator described their operations and capabilities. The workshop concluded with four parallel working group sessions which sought to identify future air support needs and consider opportunities for developing new cooperative air networks. A copy of the papers, visual aids used by speakers, and the working group findings are included in this report.

G-55587

Takahashi, A., et al, **Development of JARE deep ice coring system (III),** *Antarctic record,* Mar. 1996, 40(1), p.25-42, In Japanese with English summary. 6 refs.

A deep ice coring system for Dome Fuji has been developed under a project coordinated by the National Institute of Polar Research. Three reports have been issued already, mainly about the development of the drill system. The authors report here on the drilling site and equipment such as winch, drilling cable, mast, control panels, chip catching tools (filter) and the drill. This paper includes an outline of drilling site and work, progress of machine design and final specifications of the equipment. (Auth.)

G-55626

Guichard, A., **Status report on the potential for the application of alternative energy systems at antarctic stations & outline strategy for improved energy sustainability. Version 1.2,** Sandy Bay, Tasmania, Latitude Technologies, 1994, 24p. + appends., With French summary. Refs. passim.

The exploratory stage of the French Australian project "Alternative Energy Systems for Antarctic Stations", which ends with the publication of this report, comprised a review of the energy production systems at antarctic stations with a view towards sustainability. This report summarizes the findings of the first year's exploratory work and outlines a new future for energy provision by proposing an outline strategy for an alternative energy system research and development project. The four following aspects are essential for overall success: the development of viable and cost effective systems at the antarctic stations; the provision of a broad outlook by linking to the project long term studies, notably renewable energy potential assessment and systems modelling; the guarantee of cohesiveness and practicality of the project to achieve results and the assurance of the applicability of the project's outcomes to other remote communities. Possible energy sources include wind, solar, natural gas and hydrogen. (Auth. mod.)

G-55652

Swanson, R.L., Young, R.R., Ross, S.S., **Analysis of proposed U.S. Navy shipborne waste handling practices to address MARPOL Annex V provisions,** *Coastal management,* Jan.-Mar. 1996, 24(1), p.41-59, 60 refs.

According to the Annex V provisions of the MARPOL Protocol, ratified in 1987, the U.S. Navy must meet requirements for the disposal of solid wastes at sea by 1994, although under the National Defense Authorization Act for 1994 this requirement is extended for some U.S. Navy ships until 2008. These provisions prohibit the disposal of waste in designated special areas which include the Antarctic, Baltic, Black, Mediterranean, North, and Red Seas, plus the Caribbean and Middle Eastem Gulf areas. To meet these requirements, new waste handling procedures are under consideration. This analysis of the procedures highlights the technological issues which may compromise the larger environmental benefits.

G-55836

Thomas, J., **Geodesic dome in Antarctica threatened by snow movement,** *Naval civil engineer,* 1988, 28(1), p.13-14.

Instability of a geodesic structure due to ice creep at McMurdo Station and related engineering operations are briefly described.

G-55837

Check, P., **Antarctica assignment—it's not just a job,** *Navy civil engineer,* 1986-7, 26(3), p.19.

The engineering and maintenance activities of the Civil Engineer Corps (CEC) in managing antarctic construction and logistical operations are recounted.

G-55855

Sheers, R., **Casey Airfield project report, summer 89/90,** [1990], 12p., Unpublished MS. Covers work done during the southern summer 1989-1990.

During the first half of 1989 the Antarctic Division initiated an airfield project that culminated in the construction of an ice-snow runway with ancillary facilities. The objective was to prove the feasibility of operating heavy wheeled transport aircraft (C-130) to and from an area near Casey Station. Due to a combination of factors, to be highlighted in this report, the runway was not completed and scheduled trial flights did not take place. The aim of this report is to give a broad outline of the project, highlight difficulties encountered and to comment on the feasibility of the concept. This report is not intended to provide specific snow/ice engineering and scientific data relating to runway pavement construction. Such information is provided in other reports.

G-55882

Wiggin, D.B., **Palmer Station, Antarctica, long range development plan,** Paramus, NJ, ITT Antarctic Services, Inc., 1984, 47p. + 22 figs.

This report opens with a background of Palmer Station and its relationship to USARP operations in the Antarctic Peninsula. Detailed reviews of the required upgrades to the science support facilities and collateral improvements to the Station physical plant are then provided. The proposed LRDP for Palmer is then outlined including project scheduling and projected costs. The next sections outline construction equipment requirements and future staffing of the Station. The report closes with a summary including budgetary requirements. (Auth.)

G-55929

Bear, I., Betts, M., Boyer, P., Quilty, P., Heyward, P., ***Aurora Australis* construction gets under way,** *ANARE news,* Dec. 1988, p.3-8.

The report gives some of the details that led to the construction of this Australian antarctic research vessel. It includes a joining of ideas from all branches of the Antarctic Division, proposals from over 100 world-wide agencies, contract negotiations in 1987, the completion of design details by a Finnish ship builder, and the selection of an Australian shipyard to construct the vessel with the technical assistance from the design company. Science and resupply are the basic uses for the vessel and equipment and instruments to meet these needs are provided; a high ice classification is an obvious necessity; details of specific scientific instrumentation are provided. Brief news reports are included: an outline of the Australian antarctic science program; voyage 1 in *Icebird* in which the dominant theme was the use of aircraft in Antarctica; the Force-12 storm that destroyed four helicopters aboard *Icebird*; brief accounts of the Proceedings of the XXth SCAR in Hobart and the 8th Antarctic Treaty Consultative Meeting in Paris.

G-55954

Tobiasson, W., **Thoughts on a structure for assembling balloon experiments at Williams Field, Antarctica,** Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, Apr. 1989, 19p.

In 1989, a 20-ft high wooden panel structure with a 16-ft by 20-ft floor supported by steel beams, was proposed to fit out a 12-ft high gondola for balloon experiments at Williams Field, McMurdo Station. The gondola would be suspended from a laminated veneer wooden roof beam. The structure would be capable of withstanding high winds and heavy snowdrifts. Ski assemblies could be attached at the four comers so that the entire structure could be towed by a tracked vehicle to a new location. The total cost estimate in 1989 was $21,500.

G-55955

Tobiasson, W., **Preliminary report on the condition of the South Pole Station,** Hanover, NH, U.S. Army Cold Regions Research and Engineering Laboratory, [1989], 10p., Prepared for Division of Polar Programs, National Science Foundation.

In 1989, the Amundsen-Scott Station at the South Pole was scheduled to be replaced by a new station by the end of 1996. The main facilities of the existing station are housed in a 164-ft-diameter, 53-ft-high aluminum geodesic dome and a 726-ft-long, 46-ft-diameter metal arch. It is recommended that the new station consist of a cluster of extensible or movable steel-frame, sandwich-panel buildings, 2 stories high with a floor plan of 38 ft by 64 ft, elevated on columns about 8 ft above the surface, and less susceptible to snow loads and differential settlement from snow loads than the existing dome and arch. The dome could be used as a warehouse and portions of the arch could be used for fuel storage for the new station.

G-56080

Reinhold, A., Beyer, L., Ihde, J., Wojdziak, R., **Geodetic work at the ERS/VLBI Station O'Higgins,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.97-100, 5 refs.

DLC G890.F55.R47

The radiotelescope at O'Higgins was planned and realized as a receiving ground station for ERS-1 SAR data and as a geodetic VLBI station. An antenna was installed under the project management of IFAG under the extreme climatic conditions of Antarctica near the Chilean Bemardo O'Higgins Station in 1990-91. The antenna has been operational since Oct. 1991 for SAR-data acquistion and since Jan. 1992 for geodetic VLBI. The inauguration of the station was on Jan. 29, 1993. Step by step, the infrastructure and the station equipment has been extended and additional geodetic instruments have been installed. Intemational VLBI experiments and GPS measurements are discussed.

G-56135

Piszczor, M.F., Kohout, L.L., Manzo, M., Colozza, A.J., **Development and operation of a photovoltaic power system for use at remote Antarctic sites,** 1994 IEEE First World Conference on Photovoltaic Energy Conversion. Conference Record of the 24th IEEE Photovoltaic Specialists Conference-1994. Vol.1, New York, IEEE, 1994, p.1145-1148, 1 ref.

DLC TK2960.P48a 1994

A photovoltaic power system, designed and built at the NASA Lewis Research Center, has successfully operated for 2 summer seasons at a remote site in Antarctica, providing utility-type power for a six-person field team. The system was installed at the Lake Hoare site for approximately 5 weeks during late 1992, put into storage for the antarctic winter, and then used again during the 1993 season. The photovoltaic power system consists of 3 silicon photovoltaic sub-arrays delivering a total of 1.5 kWe peak power, 3 lead-acid gel battery modules supplying 2.4 kWh, and an electrical distribution system which delivers 120 Vac and 12 Vdc to the user. The system worked extremely well in providing quiet, reliable power. The experience gained from early system demonstrations such as this should be beneficial in accelerating the transition toward future PV systems in Antarctica and other similar areas. (Auth.)

G-56340

Higashi, A., **Utilization of large aircraft in the Antarctic,** *Polar news,* Aug. 1996, No.63, p.48-54, In Japanese. 4 refs.

A general review is presented of the main types of large aircraft and the runways to accomodate them in the Antarctic. The main types of aircraft described, with their maximum takeoff weight (MTW) and cruising speed, are the Pilatus Porter PC-6 (2.8 tons, 115 knots), Twin Otter DHC-6 (5.7 tons, 135 knots), Lockheed C-130 Hercules (79.4 tons, 300 knots), Jumbojet C-141 Starlifter (144 tons, 430 knots), and Ilyushin IL-76T (190 tons, 400 knots). Skis have been used regularly with the PC-6 and DHC-6 and on a trial basis with the C-130, but would be impractical with the C-141 or IL-76T. The construction of groomed skiways, that is, compacted snow runways for ski-equipped aircraft and the feasibility of natural bare ice runways for heavier and faster, wheeled aircraft, are also discussed.

See also:
A-54404 A-54452 A-54490 A-55212 B-54511 B-54515 B-54668
B-54736 B-55624 C-54677 C-54782 D-54998 E-54678 E-55942
F-54065 F-54420 F-54823 F-55632 F-55781 H-56301 I-54316
I-55285 I-55331 I-55509 I-55766 J-54514 J-55116 J-55117
J-55275 J-56342 K-55076 K-55841 K-55842 K-55843 K-55924
L-54950 M-55427 M-55444 M-55535

H. MEDICAL SCIENCES

H-54379

Arendt, J., **Investigations on the use of light and melatonin for alleviation of problems related to jetlag and shift work,** Proceedings of a symposium, Basel, Switzerland, June 3-5, 1993: Biologic Effects of Light 1993, edited by E.G. Jung and M.F. Holick, Berlin, Walter de Gruyter, 1994, p.219-227, 29 refs.

Circadian rhythm disturbance is thought to be responsible for many problems related to shift-work and jet lag, including poor sleep quality and work performance. Human circadian rhythm status in Antarctica was studied to investigate the effects of night shift work (fire watch) and to use bright full spectrum artificial light to attempt the manipulation of rhythms. Endogenous melatonin rhythm was used to assess circadian rhythm status with some assessment of cortisol rhythmicity. The melatonin rhythm, whether measured as plasma concentrations or urinary concentrations of its major metabolite (6-sulphatoxy melatonin, aMT6s), is a robust, high amplitude variable remarkably resistant to stress and metabolic variations. It is probably the best index of circadian status available. The author concludes that judicious, timed application of both melatonin and bright light as time cues may well be the treatment of choice for rhythm disturbance.

H-54381

Siderfin, C.D., **Low-technology telemedicine in Antarctica,** *Journal of telemedicine and telecare,* 1995, 1(1), p.54-60, 1 ref.

A Medical Assessment Questionnaire (MAQ) was developed by the British Antarctic Survey Medical Unit to help non-medically qualified people take a history and examine ill colleagues at antarctic stations. It was originally designed to be transmitted by facsimile and was later modified for use by radio. The MAQ, presented in an appendix, allows the relevant information to be gathered prior to radio contact with a doctor, and increases the accuracy of information while reducing radio time.

H-54572

Zhang, W.C., Wu, W., Yu, Y.Z., **Analyses on the physio-psychological state of the expeditioners in Antarctica,** *Antarctic research,* Dec. 1995, 6(2), p.72-75, 5 refs.

Results of physiological and psychological tests carried out in 23 male expeditioners before, after and during their travels in Antarctica are reported. The EEG β-wave frequency, β-wave index and neurasthenic symptoms increased during their stay in Antarctica; mean scores of SAS and SDS were higher than those before their departure to Antarctica; and significant prolongation of decoding-time was found at 3-6 months after their arrival in Antarctica. (Auth. mod.)

H-54575

Rothblum, E.D., Morris, J.F., Weinstock, J.S., **Women in the Antarctic: risk-taking and social consequences,** *World psychology,* 1995, 1(1), p.83-112, Refs. p.108-111.

In order to investigate risk-taking among women, the present study interviewed 36 women who had recently returned from the Antarctic. Women who go to the Antarctic are in nontraditional roles (scientists in male dominated fields, Navy personnel, or civilian support staff). Results indicate that the participants tended to compare their antarctic experience to even riskier situations, so that it seemed safe in comparison. There was a discrepancy in the types of risks that women perceived before going with those that actually occurred when they were in the Antarctic, and a sense that some women used denial as a coping strategy. Most people, including friends, family members, and co-workers, were supportive of the women's decision to go to the Antarctic. About half the women reported some lack of support (often from mothers) but were able to overcome interpersonal barriers to take the risk of travelling and working in the Antarctic. (Auth. mod.)

H-54875

Mulligan, R., **Selection of station leaders - Australian National Antarctic Research Expedition (ANARE),** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.157-176.

In conducting the selection process for people to be employed as Station Leaders, the Australian Antarctic Division is required to give full recognition to government program requirements and all administrative law processes. The selection criteria for Station Leader positions reflect these requirements, and applicants are assessed against them. Both selection and assessment procedures are described in detail.

H-54876

Rivolier, J., **Recent approaches on psychological selection of winter-overers,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.177-184, 13 refs.

The concept of psychological selection of personnel is presented at different levels, from a simple screening to long-term studies relative to extreme situations, such as space flight. With regard to wintering-over in Antarctica, it is pointed out that specific data should be considered because of the long-term isolation and the degree of confinement imposed on personnel. A subject who does not adapt to the major stress factors involved in such a situation would cause a significant disruption to the harmony and effectiveness of the group. Different testing methods and instruments are described.

H-54879

Sachdeva, U., Mehta, M., Saxena, S., Jain, P., **Psychological evaluation for the selection of members of the Indian Antarctic Expedition,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.201-211, 7 refs.

The paper reports the results of screening tests of the 12th (1992) and 13th (1993) Indian Antarctic Expeditions to determine the psychological profiles of 55 participants. The various tests included a general information questionnaire, a personality trait score, an anxiety rating scale, the Zung self rating depression scale, coping resource inventory and subjective well-being rating scale.

H-54880

Gaum, B., **Development of a standard evaluation procedure for candidate members of South African expeditions to Antarctica,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.213-229, 9 refs.

The present standard evaluation procedure for candidate members of South African Expeditions to Antarctica consists of 10 criteria points. Points 1 to 4 require factual information, are not open to interpretation and may well be used in the initial screening process. Points 5 to 10 are open to the opinions and impressions of the interviewers, and should be debated at the conclusion of every interview. The methods used are described and various test forms are appended.

H-54924

Taniguchi, N., **Dream analysis of the Antarctic Walk,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.143-157.

Dreams of three members of the Antarctic Walk Environmental Research Expedition are described, analyzed and interpreted.

H-54925

Yoshikawa, K., **Relationship of food requirements and energy**

consumption in the cold environment, Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.159-163, 1 ref.

Antarctic expeditions vary widely in terms of duration, goals and purposes. The caloric need for polar expeditions was determined during the Antarctic Walk Expedition. It was found that caloric food requirements are dependent on three factors: the amount of exertion; the duration of the expedition; and the ability to digest food. Ambient temperatures (down to -30°C) do not seem to be a major factor in caloric requirements when exertion is high. A 10-15% weight loss is not considered to be significant. (Auth.)

H-55048
Naidu, M., Sachdeva, U., **Effect of local cooling on skin temperature and blood flow of men in Antarctica,** *International journal of biometeorology,* Dec. 1993, 37(4), p.218-221, 18 refs.
DLC QH543.I5

Alterations to the finger skin temperature (Tsk) and blood flow (FBF) before and after cold immersion on exposure to an antarctic environment for 8 weeks were studied in 64 subjects. There was a significant fall in Tsk and increase in finger blood flow after 1 week of antarctic exposure. The Tsk did not further change even after 8 weeks of stay in Antarctica but a significant increase in FBF was obtained after 8 weeks. The cold immersion test was performed at non-antarctic and antarctic conditions by immersing the hand for 2 min in 0-4°C cold water. In the non-antarctic environment the Tsk and FBF dropped significantly ($P<0.001$) indicating a vasoconstriction response. Interestingly, after 8 weeks of stay in Antarctica, the skin temperature dropped ($P<0.001$) but the cold-induced drop in FBF was inhibited. Based on these observations it may be hypothesized that continuous cold exposure in Antarctica results in vasodilatation, which overrides the stronger vasoactive response of acute cold exposure and thus prevents cold injuries. (Auth.)

H-55150
Morris, J.F., Weinstock, J.S., Rothblum, E.D., **Women in the Antarctic: constructive risk-taking and social consequences,** *Antarctic journal of the United States,* 1994, 29(5), p.379-382, For another version see H-54575. 3 refs.

Women who seek antarctic duty are engaging in nontraditional behavior for most women. The first goal of this study was to investigate risk-taking among this group of women. Thirty-six women who had been in the Antarctic during the 1990-91 and/or the 1991-92 austral seasons participated in the study. The results imply that women compared the antarctic experience to even more nontraditional and often riskier situations ("Its not like climbing Mt. Everest"). The study also indicates that women who go to the Antarctic use denial both as a way of avoiding thinking about risks beforehand and as a means of coping with emotional distress in the Antarctic.

H-55151
Cravalho, M.A., **Folk psychology of the winter experience in Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.382, 5 refs.

One of the prominent features of the "microculture" that characterizes the winter community of McMurdo is a distinctive lexicon used to describe daily life there. Some of the lexicon is richly figurative. For instance, American personnel in Antarctica often employ the term "toast" to refer to comportment and mentation resulting from distress experienced during the winter. This metaphor was frequently encountered during fieldwork conducted in McMurdo in late winter 1992.

H-55152
Offen, J.L., **Voices at the bottom of the world: community identity in McMurdo,** *Antarctic journal of the United States,* 1994, 29(5), p.383, 3 refs.

An analysis of the internal newspapers published in McMurdo Station during the 1991-92 season reveals a complex, dynamic discourse about the McMurdo collective and what it means to be a member of this community. As an "artificial grouping" with a relatively short history and transient membership, formed under government auspices with both military and civilian personnel and set down on the edge of Antarctica's icy frontier, McMurdo is nonetheless constructed and represented as a self-conscious "community" by its members.

H-55272
Villar Francos, A., Luengo Fernández, E., Selva, E., Lamiel, R., Gómez Ulla, H.M.C., **Cardiovascular adaptation to cold-environment stress** [La adaptación cardiovascular al esfuerzo en ambiente frío], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.364-367, In Spanish with English summary. 1 ref.
DLC G845.S93

A study of the behavior and adaptation of the human cardiovascular system to stress in low antarctic temperatures is reported. The study was carried out by applying a Holter with continuous 24-hours ECG recordings on 14 subjects, and by measuring their blood pressure at different stages during their activities on Livingston I. It was found that the cardiovascular physiology during short-term efforts in low temperature is similar to that for the same efforts in standard temperatures, although a significant increase in FC numbers and double product O ITTM, but not in the SBSs, was recorded.

H-55273
Villar Francos, A., et al, **Psychological adaptation to cold and adverse environment in relation to pre-existing personality traits.** [Adaptación psiquica a medio ambiente frío y adverso en función de la personalidad previa. "Estudio preliminar"], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Procecdings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.368-371, In Spanish with English summary. 8 refs.
DLC G845.S93

In the present study, a series of psychometric tests on adaptation to a cold and hostile environment was performed in a group of subjects from the Spanish Antarctic Expedition 88-89. In all cases, reference tests consisting of a personality study and a medical examination were carried out in order to eliminate a possible previous organic pathology. Psychological maladjustments were verified in ca. 17% of the analyzed subjects. Advanced personnel screening is recommended. (Auth. mod.)

H-55363
Taylor, D.M., Pye, C.L., Hindson, R.M., Lugg, D., O'Dea, K., **Lipid levels of expeditioners in Antarctica: response to a reduced-fat, oleic acid and carbohydrate-enriched diet,** *Arctic medical research,* Oct. 1995, 54(4), p.160-169, 44 refs.

This study examined the effects of a reduced-fat, oleic acid and carbohydrate-enriched diet on serum lipid profiles and body weight of subjects in the setting of an isolated Australian antarctic station. A 12-week dietary intervention period was provided for 30 healthy, free-living expeditioners against a background diet typical of the Australian population. The diet tested a "modified U.S. Dietary Goals" regimen which increased oleic acid preferentially. During the intervention period, mean serum HDL-cholesterol levels remained relatively stable while mean serum total cholesterol fell significantly. The mean serum triglyceride (TG) level rose initially but returned to baseline by the end of the intervention period. The change in TG level was associated with increased dietary carbohydrate but not with changes in body weight, alcohol intake or season. The study demonstrates that a reduced-fat, oleic acid and carbohydrate-enriched diet can result in significant improvements in serum lipid profiles. The diet was acceptable to the subjects and was easily provided in Antarctica with unobtrusive changes to the typical Australian diet. (Auth. mod.)

H-55399
Matheson, B., Walker, K.Z., Taylor, D.M., Peterkin, R., Lugg, D., O'Dea, K., **Effect on serum lipids of monounsaturated oil and margarine in the diet of an Antarctic Expedition,** *American*

journal of clinical nutrition, June 1996, 63(6), p.933-938, 26 refs.

A 13-wk dietary intervention was carried out with 23 members of the 1991 wintering party of an Australian National Antarctic Research Expedition. Canola margarine and canola cooking oil were substituted for usual dietary fats (butter, a margarine containing 28% saturated fat, a polyunsaturated margarine, and vegetable oil). Mean energy intake slowly decreased although body weight slowly increased during the 42-wk winter-over period. During 13 wk of dietary substitution, mean total cholesterol and low-density-lipoprotein-cholesterol concentrations fell by 7.0% and 10.0%, respectively ($P<0.05$, repeated-measures ANOVA). These changes were not found in a second winter-over group that did not experience this dietary intervention. The data indicate that a relatively simple change to the food supply has the potential to produce significant beneficial changes in lipoprotein lipid profile. (Auth.)

H-55864

McLeod, K., **Some human resource strategies and experiences from the Australian mining industry,** Gender on ice: Proceedings of a Conference on Women in Antarctica held in Hobart, Tasmania, under auspices of the Australian Antarctic Foundation. Edited by K. Edwards and R. Graham, Canberra, Australian Government Publishing Service, 1994, p.59-66, 5 refs.

DLC HQ1870.7.G46 1994

In drawing parallels between women in Antarctica and the mining industry experience, a broad range of examples is offered which point out similarities or contrasts. Clear parallels are found in problems of isolation, the importance of understood and accepted roles for every member of a small team or group, and the need for good leadership, none of them found to provide insuperable barriers to female participation. It is concluded that increasingly, the mineral industry recognizes that the phrase "a man's world" is no longer relevant and that, by extension, should no longer pertain to Antarctica.

H-55904

Palinkas, L.A., **Sociocultural influences on psychosocial adjustment in Antarctica,** *Medical anthropology,* 1989, 10(4), p.235-246, Refs. p.245-246.

DLC GN296.M42

Although there are no permanent inhabitants of Antarctica, since World War II there have been more or less permanent habitations in the form of scientific research stations. Flying the flags of fourteen countries at last count, some of these stations operate only during the summer months while 52 are currently operated on a year-round basis. Ranging in size from a half-dozen to over 1,000 members, each station is said to possess a distinct microculture serving as a model of as well as a model for the processes of adaptation to the stressors associated with this extreme environment. The object of this paper is to identify the major sociocultural factors involved in adaptation to this environment, to examine the relationship between these factors and variations in adaptation, as reflected by measures of health and performance, and to explore the relationship between the social and individual traits which promote or inhibit adaptation.

H-55932

Mocellin, J.S.P., **Levels of anxiety aboard two expeditionary ships,** *Journal of general psychology,* July 1995, 122(3), p.317-324, Refs. p.323-324.

Previous studies conducted in the Antarctic have tended to focus on negative effects of the environment rather than on coping and stress resistance of crew members. The present study of participants aboard two expeditionary ships (n=34 and n=19) in antarctic waters indicated that anxiety levels decreased when participants experienced a stressful event, suggesting that group homogeneity, the capacity to cope with unusual situations, and perhaps previous experience in remote locations are associated with low situational anxiety as measured by the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970). (Auth.)

H-55934

Palinkas, L.A., Browner, D., **Effects of prolonged isolation in extreme environments on stress, coping and depression,** *Journal of applied social psychology,* Apr. 1-15, 1995, 25(7), p.557-576, Refs. p.572-576.

The influence of prolonged isolation in an extreme environment on depressive symptoms, personality, and coping resources was examined in 121 members of the United States Antarctic Program in 1988-89. Subjects were followed for a 1-year period in Antarctica. Winter-over personnel experienced an increase in depressive symptoms, avoidance as a coping method, and emotional discharge as a coping resource from baseline (T_0) to Year-1 (T_1). At T_0, education, negative life events, job-related stress, low self-confidence, active cognitive and behavioral coping methods, and low satisfaction with social support were independent predictors of depressive symptoms. At T_1, negative life events, low self-confidence, active behavioral and avoidance coping methods, affective regulation as a coping resource, and low satisfaction with social support were independent predictors of depressive symptoms. However, with the exception of T_0 depressive symptoms, none of the social and demographic characteristics and T_0 psychosocial measures predicted T_1 depressive symptoms. The results of this study support the hypothesis that coping may be more strongly associated with environmental conditions that influence severity of stressor and availability of coping resources than with more remote and stable background factors. (Auth.)

H-56255

Bocharov, M.I., Soroko, S.I., **Changes in human temperature sensitivity during adaptation to cold and hypoxia,** *Human physiology,* May-June 1992 (Pub. Mar. 1993), 18(3), p.214-218, Translated from Fiziologiia cheloveka. 17 refs.

DLC QP34.5.H85

Changes in human temperature sensitivity are analyzed during adaptation to the conditions of Antarctica and of high altitudes and its trend during ontogeny; the causes of contradictions in the literature relating to the function of the peripheral component in the temperature regulating system during adaption to cold are examined. It is shown that the chronic effect of cold on the human body leads to a lasting increase in sensitivity of the thermoreceptor component, which is enhanced during the combined effect of high-altitude factors. It is suggested that lowering of the threshold of excitability of the skin temperature receptors is an important mechanism in increasing the working efficiency of the temperature regulating system during changing ambient temperature conditions. The state of the cells was confirmed by experimental data on the increase in temperature sensitivity of the body during ontogeny. Both the local and the general temperature sensitivty to cold were found to increase in connection with man's natural development. (Auth.)

H-56296

Novikov, V.S., Soroko, S.I., Khavinson, V.K., Shevchenko, S.B., **State of resistance of members of polar expeditions,** *Human physiology,* Apr. 1991 (Pub. Mar. 1992), 17(2), p.124-129, Translated from Fiziologiia cheloveka. 29 refs.

DLC QP34.5.H85

The given data characterize the state of immunity of polar scientists before the beginning of an expedition and during wintering, the pattern of sickness incidence among members of the "North Pole" and Soviet Antarctic Expeditions during wintering and in the initial readaptation period, and the general principles of changes in the protective functions of the body and the morbidity pattern among polar scientists in the late period after wintering. (Auth.)

H-56301

Stroud, M.A., Jackson, A.A., Waterlow, J.C., **Protein turnover rates of two human subjects during an unassisted crossing of Antarctica,** *British journal of nutrition,* Aug. 1996, 76(2), p.165-174, 18 refs.

During the austral summer of 1992-93, two men, MS and RF, walked 2300 km across Antarctica in 96 d, unassisted by other men, animals or machines. During the journey they ate freeze-dried rations, towed on sledges, that contained an average of 21.3 MJ/d of which 56.7% was fat, 35.5% carbohydrate and 7.8% protein (98.8 g). Despite this high energy intake both men lost more than 20 kg in body weight due to their extremely high energy expenditures. Studies of protein turnover using $[^{15}N]$glycine by the single-dose end-product method were made before, during and after the journey, and these demonstrated considerable differences in the metabolic responses of the two men to the combined stresses of exercise, cold and undernutrition. However, both men maintained high and relatively stable levels of protein synthesis during the expedition despite the great exertion and the onset of considerable debilitation. This stability indicates the vital physiological function of protein synthesis.

H-56311

Haston, W., **British Antarctic Survey Medical Unit,** *NERC news,* Autumn 1996, p.8-9.

In addition to providing basic medical care for antarctic personnel, the BAS Medical Unit carries out research on this isolated community, particularly on Halley Station, and develops new techniques in telemedicine, which are discussed. Antarctic medical microbiology and the effects of prolonged daylight on human physiology are also discussed.

See also:
B-56038 G-54863 1-54374 I-56333

I. METEOROLOGY

I-54042

Ghosh, S.N., Midya, S.K., **Atmospheric ozone, its depletion and antarctic ozone hole,** *Indian journal of physics,* 1994, 68B(6), p.473-493, 30 refs.

Ozone depletion and the ozone hole at Antarctica are reviewed. Beginning in the 1960s with the availability of new information on solar radiation from rocket-borne experiments, accurate information on stratospheric reaction rates and of ozone concentrations, it became clear that the atmospheric ozone concentration was less than that predicted. Several catalytic reactions involving ozone were identified. It was further realized that solar UV-B (3200-2800 Å) radiation is not totally absorbed by the ozone layer and the remaining part affects man, animals, fishes and plants. Thus, ozone depletion poses a serious problem. It has been learnt that the depletion of ozone is due to technological progress in rocketry, supersonic aircraft flight, refrigeration, nitrogeneous fertilizers and others. Another problem of great concern to mankind was the dramatic decrease of O_3 concentration during spring in Antarctica, reported in 1985. The decrease in ozone content has been confirmed by using ground-based, balloon and satellite-borne instruments. Reactions for ozone depletion are formulated and theories are proposed for the hole. (Auth. mod.)

I-54050

Fortuin, J.P.F., Van Dorland, R., Kelder, H., **Concurrent ozone and temperature trends derived from ozonesonde stations,** Atmospheric ozone as a climate gas. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.32. Edited by W.C. Wang and I.S.A. Isaksen, Berlin, Springer-Verlag, 1995, p.131-144, 23 refs.

A linear trend study, by means of a multiple linear regression analysis, is performed on concurrent ozone and temperature data obtained from 12 ozonesonde stations, 11 of which are in the Northern Hemisphere. The regression analysis takes into account the seasonal, solar and quasi biennial cycles, plus events like volcanic eruptions and instrument change. For all stations, a significant negative ozone trend in (some regions of) the stratosphere is found, which, except for the Canadian stations and one European station, is combined with a significant stratospheric cooling. As for the troposphere, mostly insignificant or negative ozone trends over Europe and Canada respectively are accompanied by barely significant or insignificant temperature trends. The Japanese stations and Wallops I. in the U.S., on the other hand, show strong ozone increases in the lower troposphere and a clearly significant surface warming over the past two decades. Above the South Pole, an observed strong cooling during Nov. can be simulated with a radiative transfer model under the concept of fixed dynamical heating, due to the observed ozone hole deepening one month earlier. (Auth. mod.)

I-54051

Liang, X.Z., Wang, W.C., **GCM study of the climatic effect of 1979-1992 ozone trend,** Atmospheric ozone as a climate gas. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.32. Edited by W.C. Wang and I.S.A. Isaksen, Berlin, Springer-Verlag, 1995, p.259-288, 40 refs.

The climatic effect of the column ozone trend derived from TOMS data is investigated using an updated version of GENESIS general circulation model (GCM). The GCM employs a newly constructed ozone climatology that includes longitudinal variation. In the perturbed simulation, the O_3 trend is assumed to be confined to the lower stratosphere, and imposed in transient from Jan. 1979 to Dec. 1992 to incorporate both seasonal variations and linear year to year changes. In response to the O_3 depletion, the south polar (70-90°S) lower stratosphere experiences a significant cooling trend from Sep. to Jan., with a peak in Nov. This cooling is accompanied by lower tropospheric warming. For boreal winter, lower stratospheric cooling trends are also identified in the mid-latitudes of both hemispheres. These GCM signals resemble observations, and can be explained in terms of radiative forcing expectations. Over the Arctic, a relatively small O_3 loss leads the model stratosphere to warm substantially during Nov.-Jan. This is followed by a strong cooling in Mar.-May. The result cannot be attributed exclusively to the radiative forcing. Rather it indicates the dominant role of dynamical feedbacks and the importance of atmospheric inertia. Furthermore, the climate responses in the atmosphere and at the surface reveal a pronounced longitudinal contrast, especially over the Arctic where a vigorous pattern analogous to zonal waves 1-2 is identified. (Auth. mod.)

I-54118

Parthiban, S., Raghunandan, B.N., Sumathi, R., **Ab initio study of the molecular structure and vibrational spectra of dichlorine hexoxide and its significance to stratospheric ozone depletion,** *Chemical physics,* Oct. 15, 1995, 199(2-3), p.183-193, 39 refs.

To model polar stratospheric chemical reactions, five minimum energy structures have been identified for dichlorine hexoxide and ab initio calculations have been performed on these isomers. Among the five structures, the oxygen-bridged structure and a symmetrical dimer containing a Cl-Cl bond were found to be stable. Normal mode analysis has been carried out on the stable conformers. The relative strength of the O_3Cl-O and O-ClO_2 bonds of the oxygen-bridged structure is discussed on the basis of their vibrational frequencies. In addition, the paper focuses attention on the great importance of the reaction $2OClO + 2O_3 \rightarrow Cl_2O_6 + 2O_2$. The implications of these results for the chemistry of stratospheric ozone depletion are delineated. (Auth. mod.)

I-54119

Bromwich, D.H., Robasky, F.M., Cullather, R.I., Van Woert, M.L., **Atmospheric hydrologic cycle over the southern ocean and Antarctica from operational numerical analysis,** *Monthly weather review,* Dec. 1995, 123(12), p.3518-3538, 56 refs.

Moisture budget calculations for Antarctica and the southern ocean are performed using operational numerical analyses from the European Centre for Medium-Range Weather Forecasts (ECMWF), the National Meteorological Center (NMC), and the Australian Bureau of Meteorology (ABM). The analyses are intercompared for an 8-yr period from 1985 to 1992 and are evaluated against representative rawinsonde sites, which are considered accurate depictions of moisture transport at these sites. The comparisons to East Antarctic rawinsondes and those from Macquarie I. show the ECMWF analyses to be superior in reproducing sounding values at each level. While results are highly variable depending on the station location, agreement of the ECMWF analyses to zonally averaged sounding moisture flux values along the East Antarctic coast is very close. Comparison of the moisture transport convergence derived from the numerical analyses with previous moisture flux studies over the southern ocean reveals general agreement in the location of the boundary between the moisture source and sink. The ECMWF and NMC analyses place the convergence maximum slightly farther south than has been previously found. It is inferred that this results from the blocking effect of the antarctic coastal topography. The results presented here offer a substantially more positive outlook on the prospects of determining continental-scale precipitation trends in Antarctica through atmospheric methods than has been previously found and demonstrate that the ECMWF analyses provide generally good estimates. (Auth. mod.)

I-54127

Smyshliaev, S.P., **Numerical modeling of heterogeneous ozone depletion in polar stratospheric clouds,** *Russian meteorology and hydrology,* 1994, No.12, p.34-40, Translated from Meteorologiia i gidrologiia. 21 refs.

Dynamic and chemical mechanisms of the formation of spring ozone anomalies in Antarctica are under study. A two-dimensional zonal mean photochemical model is used for numerical experiments to test various theories on the "ozone hole" formation. Model results are compared with observed regularities in the space and time ozone distribution in the polar stratosphere. The experimental results show that dynamic mechanisms fail to reproduce the observed features in the antarctic ozone distribution. The heterogeneous chlorine activation shows quantitative differences, which are minimized when the direct heterogeneous ozone depletion in polar stratospheric clouds is considered. (Auth. mod.)

I-54145

Kejna, M., **Types of atmospheric circulation in the region of H. Arctowski Station (South Shetland Islands) in the years 1986-1989,** Polar Symposium, 20th, Lublin, Poland, June 3-5, 1993. Man impact on polar environment. Edited by J. Repelewska-Pękalowa and K. Pękala, Lublin, Poland, Marie Curie-Skłodowska University, 1993, p.369-378, With Polish summary. 20 refs.

Based on the calendar of types of atmospheric circulations, according to T. Niedźwiedź (1981), the frequency of occurrences of synoptic situations at the Arctowski Station for the years 1986-1989 is calculated and presented in graphs.

I-54180

Newton, I.P., **Climatic data from Robertskollen, Dronning Maud Land, Antarctica, January 1993 to January 1995,** *South African journal of antarctic research,* 1994, 24(1&2), p.103-110, 16 refs.

Two full years' data from an automatic weather station sited at Roberts Knoll are presented. Air temperature and humidity, wind speed and direction, three types of radiation and the temperature of three microhabitats of biological significance were collected. Minimum air temperatures were higher during the winter, when compared with previously collected data from the SANAE Station. The maximum air temperature recorded was 5.2°C; soil temperatures reached 34.4°C. The average weekly temperatures of the microhabitats remained above freezing from mid-Nov. to early Feb. The absolute minimum temperature (-33.6°C) was the same for air and all microhabitats. Implications for the biota living in these habitats are briefly discussed. (Auth.)

I-54194

Lehmann, P., **Statistical seasonal analysis of winter decreases in ozone at Macquarie Island,** *Geophysical research letters,* Mar. 1, 1994, 21(5), p.381-384, 10 refs.

The change in total ozone between the seasonal periods Apr. to June and July to Sep. at Macquarie I. are shown to be highly statistically significant during the latter half of the 1980s when compared to the seasonal changes observed over the period 1963-79. These results support a previous analysis by the author which indicated significant winter ozone decreases using a less rigorous method and a shorter time series. (Auth.)

I-54232

Makhijani, A., Gurney, K.R., **Mending the ozone hole: science, technology, and policy,** Cambridge, MA, MIT Press, 1995, 355p., Summary and recommendation chapters are included along with model details and results and chapter notes. Refs. p.318-344.
DLC QC879.7.M34 1995

Antarctic references are generally confined to the first two chapters. Summary points are listed in Ch. 14; they include: Ozone-layer damage is serious. Improvement will not begin until the early years of the 21st century; UVR is now showing annual increases over populated locations; health, economic, and environmental consequences could be severe; Third World declines in ODC are likely to be delayed approximately 10 years; HCFCs are more damaging than has generally been assumed; production and emissions of HCFCs are increasing; enough alternative chemicals, processes, and technologies are available to accelerate HCFC phaseouts; existing equipment will soon be the dominant source of ODC emissions; more stringent regulation of methyl bromide is needed; anthropogenic biomass burning contributes to the buildup of atmospheric chlorine and bromine; the use of waste heat in air conditioning could eliminate ODCs from many A/C applications.

I-54245

Enomoto, H., Warashina, H., Motoyama, H., Takahashi, S., Koike, J., **Data-logging automatic weather station along the traverse route from Syowa Station to Dome Fuji,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.66-75, 6 refs.

This paper introduces the unmanned meteorological observation system along the traverse route to Dome Fuji (3810 m a.s.l.), and summarizes the results of the low temperature test and operation in the Antarctic. The observation sites between Relay Point and Showa Station were checked in Jan. 1994. It was confirmed that the data loggers worked successfully through the year in 1993, but there were interruptions in the wind data. It is concluded that the data logger is satisfactory for use in inland Antarctica, but problems remain to improve sensors and to arrange fail-safe setting of loggers and instruments. (Auth. mod.)

I-54250

Yamamoto, A., Yamanouchi, T., Wada, M., **Effective emissivity of clouds from radiometersonde measurements at Syowa Station, Antarctica,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.133-145, Refs. p.144-145.

The effective emissivity of antarctic clouds is calculated from radiation measurements using a radiometersonde in 1987 at Showa Station. The accuracy of the radiometersonde near the surface is evaluated by comparison with a pyrgeometer on the ground surface. The effective emissivity is referred to vertical integrated liquid water content (LWC) from microwave radiation measurements. Though disagreement of measured volume might occur between the microwave radiometer and the sonde, the effective emissivity for downward flux correlated well to the LWC, but that for upward flux does not. A large discrepancy is found between the effective emissivity for upward flux and that for downward flux and, especially for upward flux, the effective emissivity is very small in some cases. It is surmised that the scattering of longwave radiation by water and ice particles produces this discrepancy. The value of the LWC suggests that water particles may exist closer to the cloud top than to the cloud base. Differences among features of the effective emissivity due to type of cloud systems resolved from NOAA/AVHRR imagery are not found in this study. (Auth.)

I-54251

Okada, I., Yamanouchi, T., **Seasonal change of the atmospheric heat budget over the southern ocean from ECMWF and ERBE data in 1988,** NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.9, Tokyo, National Institute of Polar Research, 1995, p.146-159, 22 refs.

Seasonal change of the atmospheric heat energy budget in the antarctic sea ice in the 60-70°S latitudinal belt in 1988 was obtained from ERBE radiation data and ECMWF global atmospheric data. The surface heat energy flux is maximum in May and minimum in Dec. or Jan., with amplitude of about 200-230 W/m^2. Positive values occur during 8 months of the year, from Mar. to Oct. The surface heat flux decreases 33-68 W/m^2 from May to July, when solar incidence is near zero. The sea-ice concentration increases from 33% to 60%; this increase appears to affect the surface heat flux. In this area, there are few observational data that can be directly compared with the present result. However, by combining observational data and assumptions for radiation and surface condition, the authors' estimate for the surface heat flux is within the range of observations in autumn. (Auth. mod.)

I-54269

Japanese Antarctic Research Expedition, **Antarctic meteorological data. Vol.35. Meteorological data at Syowa Station in 1994,** Tokyo, Japan Meteorological Agency, 1995, 330p.

This set of 1994 data collected at Showa Station includes surface reports comprised of monthly and daily summaries and synoptic data; aerological data comprised of monthly summaries and upper air observations; surface radiation measurements comprised of monthly and daily summaries and hourly readings; atmospheric turbidity measurements comprised of monthly and daily summaries; total ozone, vertical ozone and ozonosonde observations; radiometersonde data; sunphotometer data on the icebreaker *Shirase* and surface synoptic data on the route from Showa Station to Dome F, including aerosol optical depth measurements, with explanatory notes for interpretation of tables and on instruments and observation techiques.

I-54309
Fraser, P., Penkett, S., Harriss, R., Makide, Y., Sanhueza, E., **Source gases: concentrations, emissions, and trends,** Scientific assessment of ozone depletion: 1991 and World Meteorological Organization. Global Ozone Research and Monitoring Project, Report no.25. Edited by D.L. Albritton et al., Washington, D.C., London, UK, Nairobi, Kenya and Geneva, SZ, NASA, NOAA, Dept. of Environment, UN Environment Program, WMO, 1991, p.1.1-1.38, Refs. p.1.31-1.38.
DLC QC879.7.S25 1991

Source gases are defined as those gases that influence levels of stratospheric ozone (O_3) by transporting species containing halogen, hydrogen, and nitrogen to the stratosphere that are important in O_3 destruction. Examples are the CFCs, methane (CH_4), and nitrous oxide (N_2O). Other source gases that also come under consideration in an atmospheric O_3 context are those that are involved in the O_3 or hydroxyl (OH) radical chemistry of the troposphere. Examples are CH_4, carbon monoxide and nonmethane hydrocarbons. Most of the source gases along with carbon dioxide and water vapor, are climatically significant and thus affect stratospheric O_3 levels by their influence on stratospheric temperatures. This chapter updates the previous reviews of trends and emissions of source gases, either from the context of their influence on atmospheric O_3 (WMO, 1986; 1990) or global climate change (IPCC, 1990). The current (1989) global abundances and concentration trends of the trace gases are given. Data are given for several antarctic stations.

I-54310
Stolarski, R., et al, **Ozone and temperature trends,** Scientific assessment of ozone depletion: 1991 and World Meteorological Organization. Global Ozone Research and Monitoring Project, Report no.25. Edited by D.L. Albritton et al., Washington, D.C., London, UK, Nairobi, Kenya, and Geneva, SZ, NASA, NOAA, Dept of Environment, UN Environment Program, WMO, 1991, p.2.1-2.33, 68 refs.
DLC QC879.7.S25 1991

This chapter contains a review of progress since 1989 and 1990, including updating of the ozone records, in most cases through Mar. 1991. Also included are some new, unpublished reanalyses of these records including a complete reevaluation of 29 stations located in the former Soviet Union. The major new advance in knowledge of the measured ozone trend is the existence of independently calibrated satellite data records from the TOMS and SAGE instruments. This chapter compares the ozone records from many different instruments to determine whether or not they provide a consistent picture of the ozone change that has occurred in the atmosphere. Also briefly considered is the problem of stratospheric temperature change. Data from antarctic stations are cited.

I-54311
Poole, L.R., Jones, R.L., Kurylo, M.J., Wahner, A., **Heterogeneous processes: laboratory, field, and modeling studies,** Scientific assessment of ozone depletion: 1991 and World Meteorological Organization. Global Ozone Research and Monitoring Project, Report no.25. Edited by D.L. Albritton et al., Washington, D.C., London, UK, Nairobi, Kenya, and Geneva, SZ, NASA, NOAA, Dept of Environment, UN Environment Program, WMO, 1991, p.3.1-3.17, 66 refs.
DLC QC879.7.S25 1991

This chapter contains a brief review of the current state of knowledge of heterogeneous processes in the stratosphere, emphasizing those results obtained since WMO (1990). Sections are included on laboratory investigations of heterogeneous reactions, the characteristics and climatology of PSCs, stratospheric sulfate aerosols, and evidence of heterogeneous chemical processing. Antarctic PSC data are cited.

I-54312
Brune, W.H., et al, **Stratospheric processes: observations and interpretation,** Scientific assessment of ozone depletion: 1991 and World Meteorological Organization. Global Ozone Research and Monitoring Project, Report no.25. Edited by D.L. Albritton et al., Washington, D.C., London, UK, Nairobi, Kenya, and Geneva, SZ, NASA, NOAA, Dept of Environment, UN Environment Program, WMO, 1991, p.4.1-4.20, Refs. p.4.16-4.20.
DLC QC879.7.S25 1991

The goal of this chapter is to describe the causes for the observed ozone trends as they are currently understood. At present, researchers understand with considerable confidence the stratospheric processes responsible for the antarctic ozone hole but are only beginning to understand the causes of the ozone trends at middle latitudes. Even though the causes of the latter have not been clearly determined, it is likely that they, just as those over Antarctica, involve chlorine and bromine chemistry that has been enhanced by heterogeneous processes. This chapter generally presents only an update of the discussions and observations that have occurred for stratospheric processes since the last assessment (WMO, 1990), and is not a complete review of all the new information about stratospheric processes. It begins with an update of the previous assessment of polar stratospheres (WMO, 1990), followed by a discussion on the possible causes for the ozone trends at middle latitudes and on the effects of bromine and of volcanoes.

I-54313
Ramaswamy, V., Leovy, C., Rodhe, H., Shine, K., Wang, W.C., Wuebbles, D., **Radiative forcing of climate,** Scientific assessment of ozone depletion: 1991 and World Meteorological Organization. Global Ozone Research and Monitoring Project, Report no.25. Edited by D.L. Albritton et al., Washington, D.C., London, UK, Nairobi, Kenya, and Geneva, SZ, NASA, NOAA, Dept of Environment, UN Environment Program, WMO, 1991, p.7.1-7.28, 47 refs.
DLC QC879.7.S25 1991

This chapter is an update of the scientific discussions presented in Chapter 2 of the Intergovernmental Panel on Climate Change report (IPCC, 1990) concerning the atmospheric radiative and chemical species of significance for climate change. There are two major objectives of the present update. The first is an extension of the discussion on the Global Warming Potentials (GWPs), including a reevaluation in view of the updates in the lifetimes of the radiatively active species. The second important objective is to underscore major developments in the radiative forcing of climate due to the observed stratospheric ozone losses occurring between 1979 and 1990. Model results for both polar regions are given.

I-54314
Prather, M.J., Sasaki, T., Ibrahim, A.M., Stordal, F., Visconti, G., **Future chlorine-bromine loading and ozone depletion,** Scientific assessment of ozone depletion: 1991 and World Meteorological Organization. Global Ozone Research and Monitoring Project, Report no.25. Edited by D.L. Albritton et al., Washington, D.C., London, UK, Nairobi, Kenya, and Geneva, SZ, NASA, NOAA, Dept of Environment, UN Environment Program, WMO, 1991, p.8.1-8.48, 41 refs.
DLC QC879.7.S25 1991

Stratospheric ozone is the focus of this assessment, and this chapter reports predictions of ozone changes using the best global two-dimensional models of stratospheric chemistry and transport currently in use within the international scientific community. These models are not three-dimensional and thus cannot include the full range of dynamical coupling, i.e., between the large antarctic ozone losses and the circulation itself. Results presented here are, however, a significant step beyond those reported in previous United Nations Environmenta Program-World Meteorological Organization assessments. The models now incorporate heterogeneous chemical reactions expected to occur on the ubiquitous stratospheric sulfate layer, and some models have included a parametric formulation of the chemistry involving PSCs. Calculations are shown for the past decade and into the next century. The authors examined not only perturbations to column ozone (and hence solar ultraviolet at the ground), but also changes in local ozone concentrations and in key species that drive stratospheric chemistry. (Auth. mod.)

I-54315

McKenzie, R.L., Ilyas, M., Frederick, J.E., Filiushkin, V., **Ultraviolet radiation changes,** Scientific assessment of ozone depletion: 1991 and World Meteorological Organization. Global Ozone Research and Monitoring Project, Report no.25. Edited by D.L. Albritton et al., Washington, D.C., London, UK, Nairobi, Kenya, and Geneva, SZ, NASA, NOAA, Dept of Environment, UN Environment Program, WMO, 1991, p.11.1-11.14, 26 refs.

DLC QC879.7.S25 1991

A major consequence of ozone depletion is an increase in solar ultraviolet (UV) radiation received at the Earth's surface. This chapter discusses advances that have been made since the previous assessment (WMO, 1990) to the understanding of UV radiation. The impacts of these changes in UV on the biosphere are not included, because they are discussed in the effects assessment (UNEP, 1991). The major conclusions are: a significantly improved UV database and findings that biologically damaging UV has more than doubled in Antarctica; an erythemal RAF of 1.25 has been calculated; a discrepancy is found in observed UV trends between RB network and TOMS; increased high latitude SH erythemally active UV. Increases in UV effects will appear first in the SH and be more severe, and existing chemical models for ozone are unreliable.

I-54316

Harrowfield, D.L., **Role of the wind in the destruction of a historic hut at Cape Adare in Antarctica,** *Polar record,* Jan. 1996, 32(180), p.3-18, 35 refs.

In 1911 the Northern Party of Scott's British Antarctic Expedition built a wooden hut at Cape Adare, a locality known for gusting, high-velocity winds. During the expedition, the hut suffered superficial damage from 18 storms estimated at force 11-12 on the Beaufort scale. Storms during the ensuing 84 years have virtually destroyed the hut. This paper outlines the wind and storm events recorded at Cape Adare and suggests that the topography of the Adare Peninsula forces the strong southeast wind to change to an east-southeast wind only on meeting high ground. By the time it reaches Ridley Beach, it assumes the character of a high-velocity katabatic wind. It is suggested that at Cape Adare topographically reinforced winds are largely responsible for the destruction of the historic hut. The reasons for this and a possible history of hut destruction are given. (Auth.)

I-54349

Adriani, A., Deshler, T., Di Donfrancesco, G., Gobbi, G.P., **Polar stratospheric clouds and volcanic aerosol during spring 1992 over McMurdo Station, Antarctica: lidar and particle counter comparisons,** *Journal of geophysical research,* Dec. 20, 1995, 100(D12), p.25,877-25,897, 65 refs.

Coordinated observations with lidar and balloon-borne particle counters were used to characterize polar stratospheric clouds and to estimate a particle index of refraction. The index of refraction was estimated from comparisons of calculated and measured scattering ratios at a wavelength of 532 nm. The clouds, measured from McMurdo Station, were observed above 11 km at temperatures below 198 K and were divided into three classes based on their scattering properties and particle size. Clouds with a low scattering ratio, high depolarization, and significant fraction of particles with radii of >2.0 μm had a mean index of refraction of 1.42 and a mode of 1.43. Clouds with a moderate scattering ratio, low depolarization, and fewer particles of >2.0 μm had a mean index of refraction of 1.39 and a mode of 1.37. Ice clouds, apparent from measurements of high scattering ratio, high depolarization, and high concentrations of particles of >1.0 μm, had a mean index of refraction of 1.32 and a mode of 1.31. Measurements in volcanic aerosol indicated a mean index of 1.43. (Auth. mod.)

I-54352

Sowers, T., et al, **135,000-year Vostok SPECMAP common temporal framework,** *Paleoceanography,* Dec. 1993, 8(6), p.737-766, Refs. p.763-766.

The object of the present study is to introduce a means of comparing the antarctic Vostok and marine chronologies. The authors use the $\delta^{18}O$ of atmospheric O_2 (denoted $\delta^{18}O_{atm}$) from the Vostok ice core as a proxy for the $\delta^{18}O$ of seawater (denoted $\delta^{18}O_{sw}$). The underlying premise in using $\delta^{18}O_{atm}$ as a proxy for $\delta^{18}O_{sw}$ is that past variations in $\delta^{18}O_{sw}$ (an indicator of continental ice volume) have been transmitted to the atmospheric O_2 reservoir by photosynthesizing organisms in the surface waters of the world's oceans. By correlating $\delta^{18}O_{atm}$ with $\delta^{18}O_{sw}$, a common temporal framework for comparing phase relationships between atmospheric records (from ice cores) and oceanographic records constructed from deep sea cores is produced. The correlated age-depth relation for the Vostok core should not be considered an absolute Vostok timescale. It is rather the preferred timescale for comparing Vostok climate records with marine climate records which have been placed on the SPECMAP timescale. The fidelity of this common temporal framework is examined by comparing sea surface temperatures (SST) records from sediment cores with an antarctic temperature record from the Vostok ice core, demonstrating that when the southern ocean SST and antarctic temperature records are compared in this common temporal framework, they show a high degree of similarity. (Auth. mod.)

I-54364

Wójcik, G., **Atmospheric transparency and the stress of direct solar radiation in the Arctic and Antarctic** [Przeźroczystość atmosfery i natężenie bezpośredniego promieniowania słonecznego w Arktyce i na Antarktydzie], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.149-151, In Polish.

DLC G578.S955 1989

Atmospheric transparency in the Arctic is less than in the Antarctic due to the higher content of water vapor and a greater contamination of the atmosphere in the Northern Hemisphere with pollutants stemming from highly industrialized regions in the temperate Northern Hemisphere. The daily course of rays on a rectangular area from Spitsbergen and Antarctica (Bunger Hills) as a function of the height of the sun is shown. The stress of radiation and its losses in the atmosphere generated by atmospheric gas molecules, water vapor and aerosols is expressed as a percentage in proportion to the solar constant. At Spitsbergen it was 61%, with 39% losses, whereas in Antarctica it was 71% and 29% respectively, in proportion to the solar constant. (Auth. mod.)

I-54365

Wójcik, G., Marciniak, K., Kejna, K., **Twenty-four hour course of wind velocities and the frequency of its hourly values at Arctowski Station (King George Island, South Shetlands)** [Dobowy przebieg prędkości wiatru i częstość jej wartości godzinnych w stacji H. Arctowskiego (Wyspa Króla Jerzego, Szetlandy Pd.)], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.152-155, In Polish.

DLC G578.S955 1989

Wind measurements were taken at Arctowski Station between Apr. 1977 and Jan. 1978. The absolute maximum daily wind velocities vary from 17.6 in July to 23.8 miles per hour in November. (Auth. mod.)

I-54366

Wójcik, G., Marciniak, K., Morel, H., **Twenty-four hour course of wind temperatures at Arctowski Station (King George Island, South Shetlands)** [Dobowy przebieg temperatury powietrza w stacji H. Arctowskiego (Wyspa Króla Jerzego, Szetlandy Pd.)], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.155-158, In Polish.

DLC G578.S955 1989

Wind temperature measurements were taken at Arctowski Station between Apr. 1977 and Mar. 1978. Maxima most often occurred during night hours with the most (23%) between 24:00 and 1:00. The second level of maxima occurred during daytime hours, between 13:00 and 15:00

(11.6%) and 11:00-13:00 (11%). This proves that, under those climatic conditions, the dynamic factor (circulation) has a greater effect on maximum daily temperatures than the solar factor. (Auth. mod.)

I-54374

Styszyńska, A., **Bioclimatic conditions in the region of Arctowski Station during the summer period** [Warunki bioklimatyczne w rejonie stacji Arctowskiego w okresie lata], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.248-250, In Polish.

DLC G578.S955 1989

Observations dealing with pressure, temperature, air humidity and wind velocity, conducted at Arctowski Station in 1978-1987, were utilized. Analysis was carried out for 8 periods during the course of twenty-four hours in November-March. Variation in the wind chill during the course of twenty-four hours was not greater than 100 kcal/m^{2}h; between days, the variation in the wind chill amounted to (on average) 180 kcal/m^{2}h, increased especially in March, and sporadically amounted to 380-410 kcal/m^{2}h. (Auth. mod.)

I-54376

Thomas, J.P., Turner, J., Cummins, S., **Inter-relationship between near-surface vorticity, convergence and synoptic depression tracks over the Bellingshausen Sea, Antarctica,** Conference on Satellite Meteorology and Oceanography, 7th, Monterey, CA, June 1994. Preprints, Boston, American Meteorological Society, 1994, p.557-560, 4 refs.

This study was an initial investigation of the derivation of relative vorticity from wind velocities measured by the ERS-1 wind scatterometer and its relationship to the synoptic scale cyclones observed in AVHRR imagery and the UKMO Southern Hemisphere synoptic analysis for the Bellingshausen Sea area. It was demonstrated that relative vorticity fields can give a clear indication of the surface location of depression centers and convergence bands associated with fronts. A three-month mean field of relative vorticity showed a rather patchy distribution, but the main features can be explained in terms of depression center distributions from other data sources, particularly high resolution AVHRR imagery. It is noted that further work needs to be done on the best technique for summarizing cyclonic vorticity over monthly or seasonal timescales.

I-54377

Harangozo, S.A., Colwell, S.R., King, J.C., **Interannual and long-term air temperature variability in the southern Antarctic Peninsula from a reconstructed record for eastern Alexander Island,** Conference on Climate Variations, 6th, Nashville, TN, Jan. 1994. Preprints, Boston, American Meteorological Society, 1994, p.250-251, 5 refs.

In this paper, the representativeness of existing studies of interannual and long-term temperature variability in the west Antarctic Peninsula (WAP) is addressed using a newly reconstructed air temperature record for Fossil Bluff, located in eastern Alexander I. The record spans the years 1961-91 and is based on twice-daily manual synoptic observations except for 1986-91; in this period readily available monthly averages from a nearby AWS based on 8 observations/day have also been used. The eastern Alexander I. area of the WAP is colder than more northern parts of the region but a systematic poleward increase in interannual temperature variability extending south of Marguerite Bay is not apparent. Direct observational evidence for the possible existence of a warming signal in the southern WAP has also been obtained for the first time. In turn, this result lends support to the possibility of a regional scale climatic change having occurred in this part of Antarctica from at least the early 1960s onwards.

I-54392

King, J.C., **Recent climate variability in the vicinity of the Antarctic Peninsula,** *International journal of climatology,* 1994, 14(4), p.357-369, 24 refs.

Surface air temperature records from stations on the west coast of the Antarctic Peninsula show a higher degree of interannual variability and stronger long-term warming trends than recorded elsewhere in Antarctica. Possible mechanisms driving these fluctuations are investigated. The extreme climatic sensitivity of this region may be linked to a stronger coupling between temperatures and regional sea-ice extent than is seen elsewhere in Antarctica. Significant interannual persistence of air temperature anomalies suggests a link with ocean temperatures or circulation. (Auth.)

I-54400

Connolley, W.M., King, J.C., **Modeling and observational study of East Antarctic surface mass balance,** *Journal of geophysical research,* Jan. 20, 1996, 101(D1), p.1335-1343, 13 refs.

The authors examine simulations of the surface mass balance of the sector of the East Antarctic ice sheet between 2.4°W and 110.5°E as produced by the United Kingdom Meteorological Office Unified Climate Model. Estimates of the actual mass balance of this sector can be obtained from glaciological observations of snow accumulation and from studies of the atmospheric water vapor budget using radiosonde observations. The former technique gives an average sector accumulation of 104 mm/yr, and the latter yields 157 mm/yr. The modeled accumulation in this sector, 122 mm/yr, lies between these two estimates, suggesting that the model can accurately represent the processes controlling surface mass balance. However, examination of the atmospheric water vapor budget in the model shows that only 30% of the water vapor precipitated in this sector is carried by resolved-scale transport. Although the model produces the "correct" accumulation in present-day climate simulations, it is not clear that this would change appropriately if the model were used to simulate future climates. The results of this study indicate that the radiosonde technique will tend to overestimate sector accumulation, thus reconciling the two observational estimates. (Auth. mod.)

I-54401

Shindell, D.T., De Zafra, R.L., **Chlorine monoxide in the antarctic spring vortex. 2. A comparison of measured and modeled diurnal cycling over McMurdo Station, 1993,** *Journal of geophysical research,* Jan. 20, 1996, 101(D1), p.1475-1487, 42 refs.

Chlorine monoxide (ClO) mixing ratio profiles within the antarctic vortex were derived on an hourly basis from ground-based measurements of pressure-broadened emission line spectra. This data set has provided the first opportunity for a detailed comparison between the output of a photochemical model and the measured *in situ* diurnal behavior of ClO in the antarctic spring stratosphere. The authors stress the importance of the diurnal behavior in furnishing a short-term, crucial test of the catalytic chlorine chemistry which determines longer-term ozone depletion. Excellent agreement is obtained between measured and modeled diurnal change using the rate constants recommended in the 1994 Jet Propulsion Laboratory (JPL) evaluation, giving support to current understanding of perturbed chlorine chemistry in the antarctic spring vortex. It is shown that the new limits set on the dimer formation rate constant reduce the uncertainty in the daily rate of chlorine catalyzed ozone loss calculated from observed ClO concentrations by ≈40% at 186-196 K. The modeled total ozone loss rate including both chemistry and vertical transport, based on these measurements, agrees well with the amount and the linear trend of ozone loss seen throughout September in coincident balloon measurements. (Auth. mod.)

I-54406

Danilin, M.Y., Sze, N.D., Ko, M.K.W., Rodriguez, J.M., Prather, M.J., **Bromine-chlorine coupling in the antarctic ozone hole,** *Geophysical research letters,* Jan. 15, 1996, 23(2), p.153-156, 37 refs.

The contribution from the chlorine and bromine species in the formation of the antarctic ozone hole is evaluated. This modeling study examines formation of the antarctic ozone hole for a wide range of bromine concentrations and for chlorine concentrations typical of the last two decades. The photochemical evolution of a single parcel of air is followed, typical of the inner antarctic vortex (with polar stratospheric clouds (PSC)). The contributions of the different catalytic cycles responsible for ozone loss are tabulated. The deep minimum in ozone is driven primarily by the chlorine abundance. As bromine levels decrease, the magnitude of the chlorine-catalyzed ozone loss increases, because bromine suppresses ClO by accelerating the conversion of ClO and Cl_2O_2 back to HCl. For this range of conditions, the local relative efficiency of ozone destruction per bromine atom to that per chlorine atom ranges from 33 to 55, decreasing with increase of bromine. (Auth. mod.)

I-54407

Tsitas, S.R., Yung, Y.L., **Effect of volcanic aerosols on ultraviolet radiation in Antarctica,** *Geophysical research letters,* Jan. 15, 1996, 23(2), p.157-160, 22 refs.

Volcanic eruptions can inject large amounts of aerosol into the atmosphere, and at large solar zenith angles, scattering by these aerosols can actually increase the flux of UV-B radiation reaching the surface. This is surprising since aerosols increase the reflection of sunlight to space. This phenomenon makes Antarctica during spring the most susceptible place on Earth to the scattering effect of volcanic aerosols, due to the combined effect of the spring ozone hole and the large solar zenith angles characteristic of this time of year. It is shown that an aerosol layer lying above Antarctica during spring will decrease the integrated daily dose of biologically weighted irradiance, weighted by the erythema action spectrum, by only up to 5%. Hence the effects of any significant destruction of ozone induced by volcanic aerosols will not be offset by aerosol scattering. Thus after a volcanic eruption, life in Antarctica during spring will suffer the combined effects of the spring ozone hole and ozone destruction induced by volcanic aerosols, with the latter effect only slightly offset by aerosol scattering. (Auth. mod.)

I-54413

Chu, L.T., Heron, J.W., **Uptake of HBr on ice at polar atmospheric conditions,** *Geophysical research letters,* Dec. 1, 1995, 22(23), p.3211-3214, 23 refs.

The uptake of HBr in water ice has been investigated in a flow reactor under polar atmospheric conditions. The HBr uptake on ice films was determined in various molecular density ranges at 188 and 195 K. This is the first report of a laboratory study at polar atmospheric conditions that shows $HBr \cdot 3H_2O$ to be formed during the uptake process. The HBr adsorption and uptake thermodynamics were also investigated. The implications of these new findings for the heterogeneous chemistry of the polar ozone depletion are briefly discussed. (Auth. mod.)

I-54414

Shindell, D.T., De Zafra, R.L., **Chlorine budget of the lower polar stratosphere: upper limits on ClO, and the implications of new Cl_2O_2 photolysis cross sections,** *Geophysical research letters,* Dec. 1, 1995, 22(23), p.3215-3218, 17 refs.

Chlorine catalytic chemistry, which destroys ozone while cycling chlorine between Cl, ClO, and Cl_2O_2, is the primary cause of the springtime antarctic ozone hole. The authors calculated the concentrations of Cl_2O_2 which are in equilibrium with midday ground-based, aircraft, and satellite observations of ClO in the antarctic spring lower stratosphere. Two significant conclusions are presented here: (1) using the JPL 94 recommended rates and photolysis cross sections, more than ≈2.0 ppbv ClO in the polar lower stratosphere causes inferred total active chlorine to exceed the total chlorine budget. This limit is smaller than some reported ClO measurements. (2) Using smaller cross sections recently measured by Huder and DeMore [1995], the amount of Cl_2O_2 in midday equilibrium with measured ClO is approximately doubled. Activated chlorine inferred from many measurements then exceeds total chlorine in the lower stratosphere, suggesting these cross sections may be too small. (Auth. mod.)

I-54415

Herman, J.R., Newman, P.A., Larko, D., **Meteor-3/TOMS observations of the 1994 ozone hole,** *Geophysical research letters,* Dec. 1, 1995, 22(23), p.3227-3229, 20 refs.

The development of the 1994 springtime (Sep.-Nov.) antarctic ozone hole was observed by the Meteor-3/TOMS (Total Ozone Mapping Spectrometer) to result in a very low minimum ozone value, 90±5 DU (Dobson Units) on Sep. 28, 1994. During late Sep. and early Oct., the region of extremely low ozone values was centered on the geographical pole between 85°S and 90°S. The geographical extent of the ozone hole region reached a maximum during the first week in Oct. with an elliptical area covering 24×10^6 km^2, reaching to the southern tip of South America. This approximately matched previous area records. After the maximum area was reached in early Oct., the 1994 ozone hole region was very similar to the 1993 ozone hole throughout the remainder of the month. The area of low temperatures (<196 K), where polar stratospheric clouds can form and heterogeneous chemistry is significant, has not increased over the past 16 years. During this period, the large trends in the area and minimum ozone amounts of the antarctic ozone hole do not appear to be related to atmospheric temperature trends. (Auth. mod.)

I-54416

Forbes, J.M., Makarov, N.A., Portniagin, IU.I., **First results from the meteor radar at South Pole: a large 12-hour oscillation with zonal wavenumber one,** *Geophysical research letters,* Dec. 1, 1995, 22(23), p.3247-3250, 19 refs.

The first mesopause-region (ca. 92±5 km) wind measurements from the meteor radar at Amundsen-Scott Station are described. Measurements are made along four orthogonal azimuth directions approximately 2° from the geographic South Pole. A large (±20/ms) oscillation in the northward wind is observed, with 12-hour period and zonal wavenumber one. The predominant semidiurnal tide in the atmosphere is migrating with the apparent motion of the sun, with s=2. The s=1 oscillation is interpreted here to result from the nonlinear interaction between the migrating semidiurnal tide and a stationary wave with s=1. The present mechanism represents an alternative to the gravity-wave driven 'pseudotide' theory put forth by Walterscheid et al. to explain the occurrence of unexpectedly large semidiurnal tidal oscillations at high latitudes. (Auth. mod.)

I-54417

Jones, R.L., MacKenzie, A.R., **Observational studies of the role of polar regions in mid-latitude ozone loss,** *Geophysical research letters,* Dec. 15, 1995, 22(24), p.3485-3488, 22 refs.

The export of polar air to low latitudes during each winter can bring air that has undergone recent ozone depletion or air in which chlorine activation has occurred, both potentially contributing to mid-latitude ozone loss. If this 'vortex outflow' is large enough, it may influence the relationship between atmospheric chlorine loading and ozone loss; knowledge of this process is thus essential for prediction models. In this paper, *in situ* observations of nitrogen compounds from both hemispheres are used to quantify the transport of chemically perturbed polar air to lower latitudes, and show that the transport of air from the polar vortex, at least above the 400K potential temperature surface, appears small. (Auth. mod.)

I-54418

Berland, B.S., Brown, D.E., Tolbert, M.A., George, S.M., **Refractive index and density of vapor-deposited ice,** *Geophysical research letters,* Dec. 15, 1995, 22(24), p.3493-3496, 20 refs.

In an experiment designed to analyze the optical properties of polar stratospheric clouds, the refractive indices of vapor-deposited ice films were measured versus substrate temperature from 35-140 K and H_2O pressure from 1.9×10^{-7}-9.5×10^{-5} Torr using optical interference techniques. The refractive indices were measured for ice films deposited on a cooled, single-crystal Al_2O_3 substrate in vacuum. Ice densities were calculated from these refractive indices using the Lorentz-Lorenz relationship. Above 120 K, the ice films had a refractive index of n=1.31 and a density of $\rho = 0.93$ g/cm^3. Significantly lower refractive indices and densities were found at lower temperatures and higher H_2O fluxes that were consistent with microporous ices. Above 35 K, the refractive index and density progressively increased with increasing temperature and decreasing H_2O flux. The ice densities observed can be explained qualitatively using a ballistic deposition model. Estimates are also obtained for the surface diffusion of H_2O on vapor-deposited ice. (Auth. mod.)

I-54419

Glowienka-Hense, R., **GCM response to an antarctic polynya,** *Contributions to atmospheric physics,* Nov. 1995, 68(4), p.303-317, 23 refs.

The sensitivity of the Southern Hemisphere circulation to a Weddell Sea polynya is investigated with an atmospheric general circulation model. Two simulations, one with standard sea ice distribution and one with a patch of open water (a polynya) in the sea ice of the eastern Weddell Sea, are made. The mean temperature and geopotential responses are comparable to former sea ice anomaly experiments, though with much larger sea ice anomalies. The response is much stronger than the response to a Kara Sea polynya. The lower layer of the atmosphere above the polynya is warmed and the upper layer is cooled, as is the whole troposphere equatorward of the polar region. The pole-to-equator geopotential gradient is diminished. The gradient between the mid-latitude trough and the subtropical ridge, however, is stronger in the case of the Weddell Sea polynya. The transient synoptic eddy heat transport is strongly enhanced in the case of the polynya. This is different from a previous Kara Sea experiment, where the baroclinic heat transport was diminished. (Auth. mod.)

I-54437

Kyrö, E., Rummukainen, M., Taalas, P., Damski, J., Supperi, A., **Behaviour of stratospheric and upper tropospheric ozone in high latitudes,** Finnish research program on climate change; second progress report. Edited by M. Kanninen and P. Heikinheimo, Helsinki, Academy of Finland, 1994, p.73-78, 9 refs.

DLC QC981.8.C5F42 1994

There are large interhemispheric differences in the emissions of CO, NOx and hydrocarbons, which are the main precursors of the photochemical production of ozone. The concentrations of those compounds in Antarctica are almost negligible compared with the high concentrations over Europe. It is therefore interesting to compare the tropospheric ozone profiles available from Marambio and a few European arctic stations. The analysis shows that during winter the ozone concentrations are fairly equal in both hemispheres. In spring and summer up to 2-3 times higher tropospheric ozone concentrations are measured at the arctic stations than at Marambio and the arctic concentrations remain high until late autumn. This could be due to the general photochemical activation after the polar night which leads to the ozone production in the arctic troposphere, whereas at Marambio the concentration decreases following the dominance of photochemical sink reactions in the NOx-poor antarctic environment. The arctic lower troposphere is also occasionally directly influenced by European NOx/HC emissions, which lead to a strong ozone maximum in a 1-2 km thick layer during photochemically favorable weather conditions. On the other hand, lower tropospheric ozone minima have been observed during advection of sulphate-rich airmasses from Eastern Europe. No similar tropospheric anomalies have been found in Marambio data. Indications of stratospheric intrusions have been found at both hemispheres. (Auth. mod.)

I-54442

Bromwich, D.H., ed, Shawn, R., ed, **U.S. FROST: Data and Science Plan. Report from the U.S. Science FROST Workshop, 2 and 3 August 1993,** Byrd Polar Research Center. Report No.7, Columbus, 1993, 40p., 30 refs.

The First Regional Observing Study of the Troposphere (FROST) is an intensive data collection and analysis program designed to investigate the performance of forecast models poleward of 50°S latitude during three one-month periods: July, 1994; Oct. 15 to Nov. 14, 1994; and Jan., 1995. The United States scientific community plans active involvement in all phases of FROST starting with a vigorous effort to compile a comprehensive set of atmospheric data and analyses for the FROST study area. The data will be collected at the University of Wisconsin's Antarctic Meteorological Research Center for dissemination to the international FROST data and analysis centers. The U.S. scientific community will also play a key role in analyzing the FROST data and determining the data's impact on current forecast models. The data and scientific plans for the U.S. participation in FROST are outlined in this report. (Auth.)

I-54445

Tuck, A.F., et al, **Airborne chemistry and dynamics at the edge of the 1994 antarctic vortex,** *Chemical Society, London. Journal. Faraday transactions,* Sep. 21, 1995, 91(18), p.3063-3071, 35 refs.

Measurements of H_2O, NO_y, CH_4, N_2O, O_3, HCl and wind speeds taken from the ER2 high-altitude research aircraft are used to examine the chemistry and dynamics near the edge of the antarctic vortex in the period from late May to late Oct. 1994. It is shown that, as the vortex evolves over this period, the horizontal gradients of quasi-conserved quantities steepen as the polar-night jet stream strengthens. By October, there is a mixing zone, 10° of latitude wide, centered on the wind speed maximum, across which air depleted in water, NO_y, HCl and ozone has a poleward gradient in a statistical mean sense. Conversely, the recovery time of HCl in outer vortex air after exposure to polar stratospheric clouds (PSC) occurs sufficiently fast in early August that mixing-in of relatively unprocessed air seems to be the most viable explanation. The observations also show the vertical redistribution of water and NO_y (presumably as HNO_3) as a result of sedimentation in large PSC particles. Ozone loss as high as 25% occurred in early August at the vortex edge in PSC-processed but undenitrified air. Vertical profiles in outer vortex air suggest freer transport of processed air to mid-latitudes at potential temperatures below 400 K (about 100 hPa, 16 km). (Auth.)

I-54448

Walsh, J.E., **Long-term observations for monitoring of the cryosphere,** *Climatic change,* Dec. 1995, 31(2-4), p.369-394, Refs. p.391-394.

Variations of the cryosphere over decadal-to-century timescales are assessed by a survey of data on sea ice, snow cover, glaciers and ice sheets, permafrost and lake ice. The recent variations are generally consistent across the different cryospheric variables, especially when placed into the context of variations of temperature and precipitation. The recent warming over northern land areas has been accompanied by a decrease of snow cover, particularly during spring; the retreat of mountain glaciers is, in an aggregate sense, compatible with the observed warming; permafrost extent and lake ice duration show similar variations in areas for which data are available. Corresponding trends are not apparent, however, in data for some regions such as eastern Canada, nor in hemispheric sea ice data, especially for winter. The data also suggest an increase of snowfall over high latitudes, including the antarctic ice sheet. Estimates of both the climatic and the statistical significance of the recent variations are hampered by data inhomogeneities, the shortness of the records of many variables and the absence of central archives for data on several variables. The survey of recent variations leads to recommendations concerning the use of historical data, *in situ* measurements, and remote sensing applications in the monitoring of the cryosphere. (Auth. mod.)

I-54451

Climate monitor, Vol.22., Norwich, UK, University of East Anglia, 1995, 121p., 6 refs, (p.73).

All data included in this issue covers the period from Dec. 1992 through Nov. 1993, unless a different period is specified. Summaries of climatic events and country by country exceptional climatic events are presented, along with 500mb anomalies for both hemispheres. Additionally, separate sections give surface air temperature data for Arctic (59) and antarctic (25) stations. These data are given in both graphic and tabular form. Also included for these stations are tables of mean surface temperature data for the period 1946-1960 (arctic) and for 1957-1975 (antarctic).

I-54455

Vaughan, D.G., Doake, C.S.M., **Recent atmospheric warming and retreat of ice shelves on the Antarctic Peninsula,** *Nature,* Jan. 25, 1996, 379(6563), p.328-331, 32 refs.

Analyses of 50-year meteorological records have revealed atmospheric warming on the Antarctic Peninsula since 1978 and shown that a number of ice shelves have retreated. Presented here is a time-series of observations of the areal extent of nine ice shelves on the Antarctic Peninsula, showing that five northerly ones have retreated dramatically in the past fifty years, while those further south show no clear trend. Comparison with air-temperature data shows that the pattern and magnitude of ice-shelf retreat is consistent with the existence of an abrupt thermal limit on ice-shelf viability, the isotherm associated with this limit having been driven south by atmospheric warming. Ice shelves therefore appear to be sensitive indicators of climate change. (Auth. mod.)

I-54485

Ravishankara, A.R., Hanson, D.R., **Differences in the reactivity of Type I polar stratospheric clouds depending on their phase,** *Journal of geophysical research,* Feb. 20, 1996, 101(D2), p.3885-3890, 50 refs.

It has been suggested that some Type 1 polar stratospheric clouds (PSCs) are supercooled liquids containing sulfuric acid, water, and nitric acid. This paper shows that the activation of chlorine over supercooled liquids is comparable to that over solid Type 1 PSCs at the same temperature. Furthermore, at temperatures within a few degrees of the frost point, the reactions of $ClONO_2$ with HCl and H_2O would be faster if Type 1 PSCs were liquid solutions rather than solids. Thus chlorine can be rapidly activated without the formation of solid Type 1 PSCs. (Auth. mod.)

I-54486

Herber, A., Thomason, L.W., Dethloff, K., Viterbo, P., Radionov, V.F., Leiterer, U., **Volcanic perturbation of the atmosphere in both polar regions: 1991-1994,** *Journal of geophysical research,* Feb. 20, 1996, 101(D2), p.3921-3928, 52 refs.

Long-term measurements by sunphotometers of the spectral dependence of aerosol optical depth are reported for several sites in the Arctic and Antarctic for the period Jan. 1991 through Dec. 1994. In the Antarctic a pronounced increase of atmospheric turbidity was observed at the end of Sep. 1991. The observed wavelength dependence in aerosol optical depth indicated that the increase was due to the presence of fresh and therefore small stratospheric aerosol particles associated with the eruption of Cerro Hudson in Aug. 1991. A significant decrease of the perturbation by Mount Pinatubo aerosol was observed in both polar regions by the end of 1994. The measured 1.0-μm aerosol optical depths at this time were only ≈0.04; these values exceed the background level by about 0.01-0.02. Therefore the aerosol optical depth values are still slightly higher than during undisturbed conditions. In addition, the occurrence of volcanic aerosols caused changes in the spectral dependence of the aerosol optical depth in the Arctic and Antarctic. These variations, including the changes in the aerosol size distribution as derived from the aerosol optical depth, are discussed in comparison to undisturbed conditions. (Auth. mod.)

I-54500

Jones, A.E., Roscoe, H.K., Sarkissian, A., Shanklin, J.D., Wolff, E.W., **Year-round column ozone observations at 65°S: validation and polar winter data,** *Journal of quantitative spectroscopy & radiative transfer,* Sep. 1995, 54(3), p.481-494, 17 refs.

A SAOZ (System d'Analyse et d'Observations Zenithales) u.v.-visible spectrometer was installed at Faraday Station in 1990, with a view to gaining year-round measurements of column ozone. Observations have been validated by comparison with the Faraday Dobson. Agreement between the two instruments is good, with SAOZ measuring 3±2% lower than the Dobson over the comparison period. Both instruments show the same small-scale variation in column ozone. However, there is a notable seasonal signal in the ratio of (SAOZ column ozone)/(Dobson column ozone) which calls into question the validity of the SAOZ winter column ozone measurements made when the solar elevation is too low for making Dobson observations. The problem appears to lie with the calculated air-mass factors (AMFs) used in deriving vertical columns from the SAOZ slant columns. New SAOZ data were derived using empirical AMFs. The qualitative behavior of winter column ozone is the same for both sets of AMFs, showing an increase to mid-winter followed by a decrease to the spring minimum, although smaller mid-winter columns are calculated when using empirical AMFs minimum. (Auth.)

I-54518

Taalas, P., Kyrö, E., Huovila, S., Supperi, A., Tafuri, V., Ginzburg, M., **Ozone observations on Antarctic Peninsula** [Observaciones de ozono en la península Antártica], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.145-148, In Spanish.

DLC G845.5.J67

Data on ozone depletion at Marambio Station 1987-1990, monthly means of the partial pressure of ozone, and total ozone values for Jan.-Apr., Aug.-Dec. 1987-1990, are presented. Ozone depletion from the end of winter to beginning of spring was observed each year; the lowest value was measured in Oct. of 1989.

I-54546

Waters, J., et al, **Upper Atmosphere Research Satellite (UARS) Microwave Limb Sounder (MLS) experiment,** Specialist Meeting on Microwave Radiometry and Remote Sensing Applications, 3rd, Boulder, CO, Jan. 14-16, 1992. μrad '92. Proceedings. Edited by R. Westwater, Boulder, National Oceanic and Atmospheric Administration, June 1992, p.7-10.

DLC G70.39.S65

The Microwave Limb Sounder (MLS) experiment, launched Sep. 12, 1991 on Upper Atmosphere Research Satellite (UARS), is the first use of microwave limb sounding from orbit to study the Earth's atmosphere. The primary geophysical parameters obtained from the experiment are ClO (15-45 km), O_3 (15-80 km), H_2O (10-85 km), temperature (25-60 km), and pressure (30-60 km). Initial results include the first maps of enhanced levels of ClO in the antarctic lower stratosphere, the principal cause of the antarctic ozone hole. SO_2 injected into the tropical stratosphere by the Pinatubo volcano has also been measured and mapped. (Auth. mod.)

I-54547

Wada, M., Yamanouchi, Y., **Liquid water contents and precipitable waters in the atmosphere around the Syowa Station in Antarctica obtained from the data of ground based and satellite microwave radiometers,** Specialist Meeting on Microwave Radiometry and Remote Sensing Applications, 3rd, Boulder, CO, Jan. 14-16, 1992. μrad '92. Proceedings. Edited by R. Westwater, Boulder, National Oceanic and Atmospheric Administration, June 1992, p.329-333, 6 refs.

DLC G70.39.S65

Liquid water content and precipitable waters around Showa Station were estimated from data of an SSM/I mounted on the DMSP satellite and ground based microwave radiometers. The maximum values of the liquid water content and the precipitable water associated with a strong cyclone were approx. 55 mg/cm^2 and 15 mm, respectively. Considering the data of the SSM/I for the long-period mean, e.g. 3-hour mean, the maximum values of liquid water content and precipitable water were estimated to be about 25 mg/cm^2 and 10 mm, respectively. The monthly mean value of the precipitable water was about 5 mm. (Auth. mod.)

I-54559

King, J.C., **Longwave atmospheric radiation over Antarctica,** *Antarctic science,* Mar. 1996, 8(1), p.105-109, 19 refs.

The seasonal and spatial variation of downward longwave radiation (L↓) at the surface of the antarctic ice sheet is studied using data from four stations. L↓ is found to depend on the fourth power of the surface temperature but on the sixth power of the temperature at the top of the surface inversion layer. The former result is shown to be a consequence of the dominance of longwave radiation in the surface energy balance, while the latter raises questions concerning the radiative properties of antarctic clouds. Simple parametrizations of L↓ as a function of temperature are suggested; these may find application in validating General Circulation Model radiation calculations over Antarctica. (Auth.)

I-54562

Saxena, V.K., **Bursts of cloud condensation nuclei (CCN) by dissipating clouds at Palmer Station, Antarctica,** *Geophysical research letters,* Jan. 1, 1996, 23(1), p.69-72, 31 refs.

Presented here is a case study of cloud-mediated production of cloud condensation nuclei (CCN) recorded at Palmer Station on Jan. 20, 1994. Four instances of CCN bursts occurred on Jan. 17, 19, 20 and Feb. 7, 1994 when cloud base descended to the surface and dissipated under prevailing meteorological conditions. The most spectacular event occurred on Jan. 20 when the CCN concentration was enhanced by a factor of four at 0.25% supersaturation (with respect to water) compared to the pre-event concentration. At 1.25% supersaturation, the corresponding enhancement was by a factor of seven. This indicated a larger production of aerosol particles in smaller size ranges. The elevated CCN concentrations were measured for over 15 hours. (Auth. mod.)

I-54571

Sun, J.H., Xia, Q.L., Qiu, J.H., Lü, D.R., **Observations of polar stratospheric clouds at Zhongshan Station, Antarctica,** *Antarctic research,* Dec. 1995, 6(2), p.66-71, 6 refs. For Chinese original see 23I-53095.

A lidar system (694 nm) was used to measure stratospheric aerosols at Zhongshan Station between Mar. 27 and Nov. 5, 1993; a total of 53 observations were made. Vertical profiles of stratospheric aerosol backscattering ratio and the integrated backscatter coefficients over a 12-30 km altitude range are presented. The seasonal variation of the integrated backscatter coefficient (IBC) is also presented. A noticeable maximum in IBC occurs in winter. Polar stratospheric clouds are observed from late May until Sep. The vertical profiles of the stratospheric aerosol backscattering ratio clearly show a double-layer structure: one at an altitude of about 12 km, and a second at about 25 km. (Auth. mod.)

I-54573

Khan, T.M.A., Razzaq, D.A., Rabbani, M.M., **Annual variations in the meteorological parameters at Jinnah Station, Antarctica,** *Antarctic research,* Dec. 1995, 6(2), p.76-81, 5 refs.

An analysis of meteorological data obtained from the installed Automatic Weather Station (AWS) at Jinnah Station, East Antarctica is presented for the years 1991 and 1993. Due to some technical problems, the data could not be received continuously in the year 1992. Significant temperature difference is found between the warmest and the coldest months. The climate shows the moderating effect of the ocean. Low pressure and strong ESE winds are reported. (Auth. mod.)

I-54587

Hanson, D.R., Ravishankara, A.R., **Reaction probabilities of $ClONO_2$ and N_2O_5 on polar stratospheric cloud materials,** *Journal of geophysical research,* Mar. 20, 1991, 96(D3), p.5081-5090, 51 refs.

The reaction probabilities, γ, of $ClONO_2$ and N_2O_5 on ice and nitric acid trihydrate (NAT) surfaces were determined, using reactant concentrations that are typical of the lower stratosphere, and pertinent to both arctic and antarctic atmospheres, by measuring the first-order reactant loss rate coefficients over the substrate located on the walls of a fast-flow reactor. Reactants were detected using chemical ionization mass spectrometry, a sensitive technique which allows the use of low reactant concentrations. An ice surface will be converted into a less reactive HNO_3-doped ice surface in a relatively short time, and arguments are presented that this surface consisted of a NAT layer. The large differences between these results and previous measurements can be attributed to the relatively large reactant concentrations used in the previous work. The major findings of this work for polar stratospheric chlorine activation are: an efficient loss of $ClONO_2$ on pure ice surfaces, a very rapid rate for the reaction $ClONO_2$ + HCl on NAT surfaces, and the fact that pure ice surfaces will become "passivated" when coated with one monolayer of NAT crystal. (Auth. mod.)

I-54643

Heinemann, G., **Wintertime polar low over the eastern Weddell Sea (Antarctica): a study with AVHRR, TOVS, SSM/I and conventional data,** *Meteorology and atmospheric physics,* 1996, 58(1-4), p.83-102, 44 refs.

The baroclinic development of an intense meso-scale cyclone (MC) over the Weddell Sea near the antarctic coast close to the Georg von Neumayer Station (GvN) during the period Apr. 26-28, 1989 was studied by means of satellite and conventional data. ECMWF analyses, radiosonde data and surface observations were used together with AVHRR data, TOVS and SSM/I retrievals for the description of the synoptic and subsynoptic environment associated with the development of the MC. The MC had a diameter of about 500 km, a lifetime of about 40 hours and reached the intensity of a polar low. Wind speeds up to 19 m/s (with gusts up to 24 m/s) were recorded at GvN as the MC approached on 27 Apr. and remained quasi-stationary for about 24 hours. Its development took place in baroclinic conditions of strong low-level cold air advection close to the sea ice front. The genesis of the MC seemed to be triggered by a 500 hPa short-wave trough and a resemblance to a baroclinic development at a boundary layer front was observed. Low-level thickness fields from TOVS data reflected the baroclinic structure of the MC, but gradients were relatively weak. Wind speed retrievals from SSM/I data did not allow a full analysis of the wind field structure for this case, as they were limited to ice-free ocean. (Auth. mod.)

I-54644

Williams, P.F.B., **OH rotational temperatures at Davis, Antarctica, via scanning spectrometer,** *Planetary and space science,* Feb. 1996, 44(2), p.163-170, 21 refs.

Spectra of the OH[8-3] Meinel band were recorded via scanning spectrometer at Davis Station during the austral late autumn to early spring, 1987. From the P_1 branch intensity distribution, rotational temperatures averaged over periods of 30-90 min were obtained. A test for approximation to the Boltzmann distribution of the rotational energies was employed, and its scatter matched to computer modelled error distributions. A most probable seasonal average rotational temperature of 205 K(±5 K at the 95% confidence level) was deduced, in good agreement with current models of kinetic temperature at 85 km altitude. A mesopause temperature between 180 and 190 K is inferred. The seasonal trend exhibited an abrupt post-midwinter cooling, and is in poor agreement with the models. (Auth.)

I-54656

White, J.W.C., Ciais, P., Figge, R.A., Kenny, R., Markgraf, V., **High-resolution record of atmospheric CO_2 content from carbon isotopes in peat,** *Nature,* Jan. 13, 1994, 367(6459), p.153-156, 34 refs.

The understanding of how future changes in atmospheric carbon-dioxide concentrations will affect the global climate system arises in part from comparing past changes in climate and CO_2. To date, these comparisons have come mainly from ice-core data, which show a strong correlation between past atmospheric CO_2 concentration and polar temperature. A new method is presented for reconstructing atmospheric CO_2 concentration using the $^{13}C/^{12}C$ ratio ($\delta^{13}C$) in mosses and sedges in peat. The method exploits the fact that, unlike sedges and most other plants, mosses do not possess stomata, and are therefore unable to regulate their uptake of CO_2 and water. The $\delta^{13}C$ of mosses thus depends on both atmospheric CO_2 concentration and available water, and the $\delta^{13}C$ of sedges from the same peat can be used to remove the water signal. The method provides a resolution of about a decade—much higher than is possible from ice cores. Initial results for the past 14,000 years show three sharp increases in atmospheric CO_2 concentration: at 12,800 years ago, corresponding to an episode of warming in the North Atlantic region; 10,000 years ago, corresponding to the end of the Younger Dryas cold period; and 4,400 years ago, after which time modern climates were established globally. (Auth. mod.)

I-54669

Edwards, N., Mobbs, S., **Solitary wave-turbulence interaction in the stable atmospheric boundary layer,** Advances in Turbulence V: European Turbulence Conference, 5th, Siena, Italy, 5-8 July, 1994, Proceedings. Edited by R. Benzi, Dordrecht, Netherlands, Kluwer Academic Publishers, 1995, p.122-126, 4 refs.

A numerical model and observations from Antarctica are used to study the interaction between solitary waves and turbulence in a stably-stratified atmospheric boundary layer. The effect of the turbulence on the waves is found to be small. The turbulence, by contrast, is strongly affected by the waves, with the variation in the wave-induced turbulence stresses being roughly linear in the wave amplitude. The turbulence remains close to equilibrium throughout the interaction.

I-54671

Nakajima, H., Okano, S., Fukunishi, H., Ono, T., **Observations of thermospheric wind velocities and temperatures by the use of a Fabry-Perot Doppler imaging system at Syowa Station, Antarctica,** *Applied optics,* Dec. 20, 1995, 34(36), p.8382-8395, 21 refs.

A new optical instrument, the Fabry-Perot Doppler imaging system, has been developed for observation of two-dimensional distributions of thermospheric wind velocities and temperatures by the measurement of the Doppler shift and width of the aurora or of the airglow emission lines of atomic oxygen OI 557.7 nm and OI 630.0 nm over a wide field of view (165°). A technique for the derivation of Doppler temperatures and wind velocities was developed by use of a truncated Fourier series. Thermospheric wind velocities and temperatures have been obtained with unprecedented high temporal and spatial resolutions. Errors in the derived wind velocities and temperatures are estimated to be less than 25 m/s and 100 K for inner-fringe positions and 35 m/s and 170 K for outer-fringe positions. This system was applied to observations of thermospheric wind velocities and temperatures at Showa Station for the period of one austral winter in 1990. (Auth. mod.)

I-54672

Panegrossi, G., Fuà, D., Fiocco, G., **1-D model of the formation and evolution of polar stratospheric clouds,** *Journal of atmospheric chemistry,* Jan. 1996, 23(1), p.5-35, 42 refs.

A 1-D model of the formation and seasonal evolution of polar stratospheric clouds (PSCs) is described. The model considers PSCs of types 1 and 2 in the vertical range from 8 to 30 km and uses real temperature data. The micro-physical processes included in the model are heterogeneous nucleation and condensation (or evaporation), while sedimentation, gas diffusion and vertical wind velocity are the processes responsible for transport. Model simulations have been compared with PSC data obtained by lidar at the South Pole; results for the 1990 winter are discussed. The different contribution of type 1 and type 2 PSCs to the measured backscattering coefficient has been evidenced. In the simulations, layers of NAT particles form when low values of the backscattering coefficient are measured; similarly, ice particles form when sharper and rapidly changeable structures with higher values of the backscattering coefficient are observed. Significant results on the condensation and depletion of HNO_3 and H_2O are presented. (Auth. mod.)

I-54704

Amos, A.F., **AMLR program: The mean summer windfield in the Elephant Island area,** *Antarctic journal of the United States,* 1994, 29(5), p.204-206, 5 refs.

During the AMLR cruises, meteorological and surface oceanographic data are collected continuously. This article uses the underway data to look at the variability of the surface windfield from year to year and leg to leg. Daily means are calculated from data collected at 1-minute intervals. The mean wind vector for each leg and the overall mean for the AMLR survey area are also calculated for each of the five AMLR cruises aboard the NOAA ship *Surveyor* from 1990 to 1994. The AMLR survey area is centered on Elephant I. and extends south and west to include King George I.

I-54738

Lugar, R.M., **Results of monitoring for PCDDs and PCDFs in ambient air at McMurdo Station, Antarctica,** U.S. Department of Energy and U.S. National Science Foundation. Interagency Agreement No. DPP-9102787, Washington, Sep. 1993, 22p., Unpublished manuscript. 4 refs.

This report presents the results of ambient air monitoring for polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) performed during the 1992-1993 austral summer in the vicinity of McMurdo Station. Fifteen air samples were collected from 4 different locations for determination of the presence and concentration of PCDD/PCDF compounds. General Metal Works Inc. PS-1 air samplers equipped with polyurethane foam (PUF) with a sample flow rate of approximately 0.27 m^3/min. were used to collect air samples. Sampling site selection, sampling procedures, and quality assurance procedures used were consistent with U.S. Environmental Protection Agency guidance for local ambient air quality networks. PCDD/PCDF compounds were not detected at the predominantly upwind location nor at a more remote site on Black I. Trace levels of only a few PCDD/PCDF congeners were detected sporadically at a location approximately 500 m downwind of the station. The initial baseline effort demonstrated that site selection and sampling equipment performance were satisfactory, provided useful data for assessing the impact of McMurdo operations on the local ambient air quality, and provided baseline data for assessing the antarctic continental air quality. (Auth. mod.)

I-54739

Lugar, R.M., **Results of PM_{10} and TSP monitoring at McMurdo Station, Antarctica,** U.S. Department of Energy and U.S. National Science Foundation. Interagency Agreement No. DPP-9102787, Washington, May 1993, 13p., Unpublished manuscript. 8 refs.

This report presents the results of ambient air monitoring of particulate matter performed during the 1992-1993 austral summer in the vicinity of McMurdo Station. Thirty-three 24-hour samples were collected from 3 locations for determination of the concentration of particulate matter less than 10 microns (PM_{10}), and 7 samples collected for determination of total suspended particulate matter (TSP) concentration. Critical flow high volume air samplers with a sample flow rate of approximately 1.1 m^3/min. were used to collect the particulate matter on quartz fiber filters for subsequent gravimetric analysis. Sampling site selection, sampling procedures, and quality assurance procedures used were consistent with U.S. Environmental Protection Agency guidance for local ambient air quality networks. All PM_{10} results met the U.S. National Ambient Air Quality Standard. TSP results at all locations were greater than PM_{10} concentrations, ranging from 8 micro-g/m^3 at the upwind location to a maximum measurement of 276 micro-g/m^3 at the "downtown" location. The initial baseline effort demonstrated that site selection and sampling equipment performance were satisfactory, and provided useful data for assessing the impact of McMurdo operations on the local ambient air quality. (Auth. mod.)

I-54740

Lugar, R.M., **Results of SO_2, NO_x, and CO monitoring at McMurdo Station, Antarctica,** U.S. Department of Energy and U.S. National Science Foundation. Interagency Agreement No. DPP-9102787, Washington, May 1993, 20p., Unpublished manuscript. 17 refs.

This report presents the results of ambient air monitoring of carbon monoxide (CO), sulfur dioxide (SO_2), nitric oxide (NO), nitrogen dioxide (NO_2), and total oxides of nitrogen (NO_x) performed during the final weeks of the 1992-1993 austral summer in the vicinity of McMurdo Station. Commercially available, high sensitivity ambient air gas analyzers were used to continuously measure gas concentrations at 2 locations over a 2 and a 3 week time period respectively. Sampling site selection, sampling procedures and quality assurance procedures used for this effort were consistent with U.S. Environmental Protection Agency guidelines for local ambient air quality networks. CO, SO_2, and NO_2 concentrations measured were below the associated U.S. National Ambient Air Quality Standards. The impact on local air quality of ships docked at an ice pier was observed and quantified. The initial baseline effort demonstrated that site selection and sampling equipment performance were satisfactory, and provided useful data for assessing the impact of McMurdo operations on the local ambient air quality. (Auth. mod.)

I-54758

Butchart, N., Austin, J., **On the relationship between the quasi-biennial oscillation, total chlorine and the severity of the antarctic ozone hole,** *Royal Meteorological Society. Quarterly journal A,* Jan. 1996, 122(529), p.183-217, 38 refs.

A 3-dimensional model of the dynamics and radiation of the stratosphere and mesosphere is used to simulate austral spring conditions. An idealized representation of the Southern Hemisphere planetary waves is prescribed at the 316 mb model lower boundary, and the tropical zonal winds are relaxed towards an idealized time-dependent representation of the quasi-biennial oscillation (QBO). For the QBO phase giving lowest temperatures the simulated ozone holes are consistently deeper but with reduced sensitivity for high chlorine amounts. Differences in polar ozone amounts between the two phases are comparable with the observed interannual variability. In the model the results show that the QBO modulates the severity of the antarctic ozone hole directly through the wave-induced transporting circulation rather than indirectly through the temperature-dependent heterogeneous chemistry. Further, it is argued that the phases of the QBO producing the two extreme responses in the springtime ozone amounts over Antarctica are likely to depend on details of the tropospheric planetary-wave flux. The model results are also shown to be consistent with the observed downward trend in Oct. antarctic temperatures since 1979. (Auth. mod.)

I-54759

Barnes, R.J., Lock, M., Coleman, J., Sinha, A., **Observation of a new absorption band of HOBr and its atmospheric implications,** *Journal of physical chemistry,* Jan. 11, 1996, 100(2), p.453-457, 25 refs.

In a study relating to ozone depletion, a new absorption band of HOBr centered near 440 nm was detected by monitoring the yield of OH radicals as the wavelength of an excitation laser is scanned over the region from 440 to 650 nm. The band is believed to arise from excitation to a triplet state of HOBr, and although its peak absorption cross section is fairly modest, its influence on determining the photochemical lifetime of HOBr is largely due to its proximity to the peak of the solar actinic flux. Preliminary estimates suggest that inclusion of absorption by this new band system will shorten the photochemical lifetime of tropospheric HOBr in the polar regions by a factor of 2 compared to the recently recommended value based on the near-UV absorption bands alone. (Auth. mod.)

I-54774

Georgiadis, T., **Surface fluxes and aerial measurements in antarctic climate studies** [Misure di flussi alla superficie e da aereo per studi climatici dell'atmosfera antartica], *Ambiente Antartide,* Dec. 1995, No.6, p.23-25, In Italian with English summary.

Land surface, ocean and atmosphere interact over a wide range of spatial and temporal scales to influence the global climate system. Inadequate representation of these interactions is a major weakness in current climate models. One current need is the calibration of general circulation models (GCMs), since it is important to review progress regularly and to integrate the knowledge with a better understanding gained from observational studies. SCAR has made recommendations concerning climate studies in Antarctica, one of which is the determination of heat, moisture and momentum fluxes. These SCAR guidelines stress the great importance of the role played by the surface energy balance on the overall climate of the continent. Current knowledge is based on data collected by a number of widely scattered stations at the surface. Extrapolation of local measurements of fluxes to estimate regional patterns requires databases that describe the geographical characteristics and the total areal extent of factors associated with fluxes. (Auth. mod.)

I-54775

Ciattaglia, L., Guerrini, A., **PNRA contribution to the ground based observing system of the ozone hole in Antarctica,** *Ambiente Antartide,* Dec. 1995, No.6, p.25-27, 2 refs.

The Italian National Program for Antarctic Research has installed Brewer spectrophotometers at Belgrano II Station (Argentina) and Scott Base (New Zealand); the equipment is operated by scientists of the two countries within the GAW and WMO networks; data are sent to the Canadian AES. Total ozone data and UV radiation monitoring show variations typical of the seasonal antarctic ozone hole; vertical Umkehr profiles also confirm the recurrent depletion of stratospheric ozone during the period of Sep. through Nov. (Auth.)

I-54786

König-Langlo, G., Herber, A., **Meteorological data of the Neumayer Station (Antarctica) for 1992, 1993, and 1994,** *Berichte zur Polarforschung,* 1996, No.187, 101p., 22 refs.

The new location of Neumayer Station, about 8km SE of Georg-von-Neumayer Station, is the site of the meteorological observatory on Ekström Ice Shelf, whence came the data included in this report. Synoptic surface observations are made at three-hourly intervals beginning at midnight UTC. Upper air soundings, from 100m to about 37,000m, are made once daily at about 10:00 UTC and include measurements of air pressure, temperature, humidity, and wind speed and direction. Monthly means are derived from both sources and are presented in tabular and other forms. Solar radiation and ozone measurements are made by five pyranometers, one pyrheliometer, one TUVR, two pyrgeometers and one photoelectric light detector.

I-54790

Waelbroeck, C., et al, **Comparison of the Vostok ice deuterium record and series from southern ocean core MD 88-770 over the last two glacial-interglacial cycles,** *Climate dynamics,* Dec. 1995, 12(2), p.113-123, 46 refs.

Taking advantage of the fact that the Vostok deuterium (δD) record now covers almost two entire climatic cycles, the authors applied the orbital tuning approach to derive an age-depth relation for the Vostok ice core, which is consistent with marine time scale. A second age-depth relation for Vostok was obtained by correlating the ice isotope content with estimates of sea surface temperature from southern ocean core MD 88-770. Both methods lead to a close correspondence between Vostok and MD 88-770 time series. However, the coherence between the correlated δD and insolation is much lower than between the orbitally tuned δD and insolation. This reflects the lower accuracy of the correlation method with respect to direct orbital tuning. The authors compared the ice and marine records set in a common temporal framework, in the time and frequency domains. Results indicate that changes in the antarctic air temperature clearly lead variations in global ice volume in the obliquity and precession frequency bands. The relatively large lag found between Vostok δD variations and obliquity-driven changes in insolation suggests that variations in the local radiative balance are not the only mechanism responsible for the variability in surface temperature at those frequencies. (Auth. mod.)

I-54791

Harries, J.E., **Space data from scientific projects,** European Association for the International Space Year (EURISY) Symposium on the Earth's Environment—an Assessment from Space, Venice, Italy, Apr. 10-11, 1991. Proceedings and European Space Agency. Special publication No.337, Noordwijk, 1991, p.67-77.

DLC QC981.8.C5 E94

The paper provides a brief review of the use of Earth observation from space for scientific studies of the global environment. Examples are given of observations of the atmosphere, oceans, and other components of the climate system, including the antarctic ozone hole, which illustrate the power of global data sets that are uniquely available from space. Some lessons for future research are discussed. (Auth.)

I-54795

Kotliakov, V.M., Lorius, K., **Climate of the penultimate ice age according to data from an antarctic ice core** [Klimat predposledniĭ lednikovoĭ epokhi po dannym Antarkticheskogo ledianogo kerna], *Rossiĭskaia akademiia nauk. Izvestiia. Seriia geograficheskaia,* Nov.-Dec. 1993, No.6, p.5-19, In Russian with English summary. 26 refs.

Climatic conditions of the penultimate ice age are analyzed on the basis of isotope-geochemical analyses of the ice core from the Vostok Station borehole drilled to a depth of 2546 m. Chronology of glacial sediments, time changes of the air temperature and gas composition of the former atmosphere have been specified. Results of the Vostok ice core interpretation were compared to analyses of oceanic cores. Climatic interpretation of new results back to 200,000 years B.P. is presented. It is shown that during 140-220,000 years B.P. a long cold period similar to the Last Ice Age existed in East Antarctica.

I-54796

Cooper, P.L., Abbatt, J.P.D., **Heterogeneous interactions of OH and HO_2 radicals with surfaces characteristic of atmospheric particulate matter,** *Journal of physical chemistry,* Feb. 8, 1996, 100(6), p.2249-2254, 36 refs.

The heterogeneous interactions of OH and HO_2 radicals with a number of surfaces characteristic of atmospheric particulate matter have been studied by using a low-temperature flow tube coupled to a resonance fluorescence detector. The study relates to the chemistry of ozone depletion. In particular, the mass accommodation coefficients of both OH and HO_2 on supercooled sulfuric acid solutions have been measured. Radical uptake coefficients (γ) were also measured on a variety of solid surfaces prevalent in the atmosphere: water ice, NH_4HSO_4 and $(NH_4)_2$. SO_4. On water ice, it was found that the uptake coefficients of both OH and HO_2 were relatively small. The OH uptake coefficient could be significantly increased by either adsorbing HNO_3 to the surface or melting the ice surface by exposure to relatively high partial pressures of HCl. (Auth. mod.)

I-54797

Bertram, A.K., Patterson, D.D., Sloan, J.J., **Mechanisms and temperatures for the freezing of sulfuric acid aerosols measured by FTIR extinction spectroscopy,** *Journal of physical chemistry,* Feb. 8, 1996, 100(6), p.2376-2383, 27 refs.

The authors have measured the freezing curve of liquid H_2SO_4/H_2O aerosol droplets having average radii of approximately 0.2 µm, in a simulation of polar stratospheric chemistry. At the freezing point, a microcrystallite of pure ice ($H_2O(s)$) nucleates in the aerosol droplet, and this causes a small change in the spectrum near 3250/cm. By recording the temperatures at which the crystallites appear for different acid concentrations, the freezing curve was mapped. The study describes the experimental technique and reports the freezing curve for the concentration range up to 35 wt% H_2SO_4, which corresponds to the first eutectic point on the phase diagram of the bulk material. The aerosol supercools by about 35 K below the temperature at which the corresponding bulk material freezes. These data show that the overall freezing mechanism is similar to that of the bulk solution: after nucleation, the crystallite grows with decreasing temperature, causing the remaining acid to become more concentrated due to the removal of H_2O until eventually a eutectic mixture forms. (Auth. mod.)

I-54798

Graham, J.D., Roberts, J.T., Brown, L.A., Vaida, V., **Uptake of chlorine dioxide by model polar stratospheric cloud surfaces: ultrahigh-vacuum studies,** *Journal of physical chemistry,* Feb. 22, 1996, 100(8), p.3115-3120, 40 refs.

An investigation of the interaction of chlorine dioxide (OClO) with the surface of ice is reported, in tests which simulate polar stratospheric cloud chemistry. Experiments were carried out under ultrahigh vacuum on films between 10 and 100 water monolayers thick. The initial OClO adsorption probability on ice at 100 K is high, approaching unity on both the crystalline and amorphous surfaces. At low coverages, OClO is quantitatively incorporated into the ice bulk, where it resides until sublimation of the ice film near 185 K. An adsorbed state of OClO is formed at moderate exposures. Chlorine dioxide desorbs from ice at approximately 130 K. At high exposures, OClO condenses to form a multilayer film, which sublimes near 135 K; the sublimation energy is 38 kJ/mol. If adsorbed OClO is covered with an ice film 13 monolayers thick, OClO is trapped within the film, and desorption is completely suppressed until the onset of ice sublimation. (Auth. mod.)

I-54807

Bromwich, D.H., Liu, Z., **Observational study of the katabatic wind confluence zone near Siple Coast, West Antarctica,** *Monthly weather review,* Mar. 1996, 124(3), p.462-477, 40 refs.

A month-long field program to study the springtime katabatic wind confluence zone has been carried out near Siple Coast. Ground-based remote sensing equipment (sodar and RASS), along with conventional observations, were used. By combining the analyses of surface observations with wind and temperature profiles, the following picture for the cross-sectional structure of the confluence zone emerges. A relatively cold katabatic airflow, which probably comes from East Antarctica, occupies the layer between the surface and roughly 500 m AGL. Low-level jets are present below 200 m AGL and are stronger near the Transantarctic Mountains. Weak-inversion-layer tops are found near 500 m AGL, which is roughly equal to the depth of the cold katabatic flow. This warm flow originates near the surface far upslope in the vicinity of Byrd Station. A baroclinic zone, formed where the two drainage flows are horizontally adjacent, appears to become unstable with some frequency to generate mesoscale cyclones. (Auth. mod.)

I-54810

Brown, L.A., Vaida, V., Hanson, D.R., Graham, J.D., Roberts, J.T., **Uptake of chlorine dioxide by model PSCs under stratospheric conditions,** *Journal of physical chemistry,* Feb. 22, 1995, 100(8), p.3121-3125, 47 refs.

The uptake of chlorine dioxide by ice at temperatures approaching those needed for polar stratospheric cloud (PSC) formation in the antarctic stratosphere was studied. The two approaches used in this investigation involved modeling the surface coverage using kinetic parameters obtained in an ultrahigh-vacuum surface experiment and comparing these results to the uptake measured in a flow tube apparatus. For an OClO gas phase concentration of 5×10^{10} molecules/cm^3, a surface coverage of $2 \times 10^{-4\pm1}$ monolayers of OClO was estimated on the ice at 189 K from both methods. For an average OClO concentration in the antarctic stratosphere of 2×10^9 molecules/cm^3, a surface coverage of $7 \times 10^{-6\pm1}$ monolayers of OClO on PSCs is predicted. (Auth. mod.)

I-54813

Madronich, S., McKenzie, R.L., Caldwell, M.M., Björn, L.O., **Changes in ultraviolet radiation reaching the Earth's surface,** *Ambio,* May 1995, 24(3), p.143-152, 130 refs.

An analysis is presented of improvements made in the quality and quantity of UV measurements made over the past several years. Examples are given of the measurements made in Chile, Argentina, Australia, and New Zealand, showing comparisons with corresponding northern latitudes. Antarctic measurements over the South Pole and Palmer Station are discussed and compared with values measured over San Diego. Global ozone measurements from satellites from 1979-1993 imply significant UV-B increases at mid- and high-latitudes in both hemispheres, but only small changes in the tropics. Global UV levels are predicted to peak at about the turn of the century, then recovery to pre-ozone depletion levels is expected to take place gradually over the ensuing 50 years.

I-54820

Naithani, J., Dutta, H.N., **Acoustic sounder measurements of the planetary boundary layer at Maitri, Antarctica,** *Boundary layer meteorology,* Oct. 1995, 76(1-2), p.199-207, 21 refs.

The planetary boundary layer (PBL) over the Indian antarctic station Maitri has been studied using a monostatic acoustic sounder. Acoustic sounder records reveal that the antarctic PBL remains stably stratified throughout the year except for some periods in the peak summer months. The summertime PBL exhibits a diurnal variation with ground-based inversions developing at night and convective plumes occurring during the peak sunlight hours. The cyclonic inflow of warm oceanic air towards the continent's interior from the coast helps in the development of the elevated layers and of the Kelvin-Helmholtz waves observed on the sodar records. (Auth. mod.)

I-54821

Yuan, X.J., Cane, M.A., Martinson, D.G., **Cycling around the South Pole,** *Nature,* Apr. 25, 1996, 380(6576), p.673-674, 9 refs.

The authors provide an analysis of a paper concerning a recently discovered interannual Antarctic Circumpolar Wave, published in this same issue of *Nature.* They point out newly created avenues for research and some additional associations which could be made as a result of this discovery.

I-54822

White, W.B., Peterson, R.G., **Antarctic circumpolar wave in surface pressure, wind, temperature and sea-ice extent,** *Nature,* Apr. 25, 1996, 380(6576), p.699-702, 22 refs.

The southern ocean is the only oceanic domain encircling the globe. It contains the strong eastward flow of the Antarctic Circumpolar Current and is the unifying link for exchanges of water masses at all depths between the world's major ocean basins. Interannual variability has been often observed at high southern latitudes, and observations of sea-ice extent suggest that such features propagate eastwards around the southern ocean. Here the authors use data from a variety of observational techniques to identify significant interannual variations in the atmospheric pressure at sea level, wind stress, sea surface temperature and sea-ice extent over the southern ocean. These anomalies propagate eastward with the circumpolar flow, with a period of 4-5 years and taking 8-10 years to encircle the pole. This system of coupled anomalies, named the Antarctic Circumpolar Wave, is likely to play an important role in climate regulation and dynamics both within and beyond the southern ocean. (Auth. mod.)

I-54830

Johnson, B.J., Deshler, T., **Record low ozone measured at McMurdo Station, Antarctica, during the austral spring of 1993,** *Antarctic journal of the United States,* 1994, 29(5), p.249-251, 6 refs.

Forty vertical profiles of ozone were measured at McMurdo Station from Aug. 23 to Oct. 30, 1993. In addition, three condensation nuclei and seven aerosol profiles were measured. The pre-depletion profile was measured on Aug. 30 when total ozone was 275 Dobson units (DU). Ozone declined at a relatively linear rate during Sep., reaching a record low 130 DU by Oct. 2, a 55% loss. Data are given on the profile of Oct. 19 when the main ozone layer between 12 and 20 km dropped to a record low 7 DU. Another figure shows the aerosol profiles measured on Sep. 6 for particles in the size range of 0.12 to 0.75 μm radius. It is suggested that much of the stratosphere may have been depleted of nitric acid and water vapor from the formation and settling out of PSCs earlier in the season.

I-54831

Adriani, A., Gobbi, G.P., Di Donfrancesco, G., **Polar stratospheric clouds observed by lidar at McMurdo Station during the 1993 winter,** *Antarctic journal of the United States,* 1994, 29(5), p.251-252, 3 refs.

Since 1990, a lidar system has been operating at McMurdo Station during the local spring. In 1993 it performed measurements between Mar. 1 and Oct. 10. During the 1993 winter and spring, the antarctic stratosphere still presented a measurable amount of volcanic aerosol from the Mount Pinatubo eruption. A figure shows the temperature field at different altitudes vs. time over McMurdo Station between Apr. 1 and Oct. 10, 1993; lidar measurements up to 40 km were added to complete the temperature field. The lidar is able to monitor the atmospheric temperature from 25 to 60 km; however, only the measurements concerning the presence of PSCs are discussed here.

I-54832

De Zafra, R.L., Trimble, C., Reeves, M., Cheng, D.J., Shindell, D.T., **Measurement of stratospheric trace gases by millimeter-wave spectroscopy for an annual cycle at the South Pole,** *Antarctic journal of the United States,* 1994, 29(5), p.253-254, 7 refs.

Chemistry and transport processes in the south polar stratosphere have been intensively studied since discovery of the seasonal ozone hole over Antarctica. Nevertheless, large gaps still exist in the knowledge of the dynamical and chemical behavior of the polar winter vortex. The work described here was intended to fill some of these gaps by frequently monitoring the behavior of several trace gases over as much of a full year cycle as possible, from a central position within the annually forming winter vortex region. Trace gas experiments carried out at the Amundsen-Scott Station on an almost daily basis from Feb. 5, 1993 until Jan. 10, 1994 are described.

I-54834

Booth, C.R., Lucas, T.B., Mestechkina, T., Tusson, J., IV, **High-resolution ultraviolet spectral irradiance monitoring program in polar regions: nearly a decade of data available to polar researchers in ozone and ultraviolet-related studies,** *Antarctic journal of the United States,* 1994, 29(5), p.256-259, Refs. p.258-259.

The Antarctic Ultraviolet Spectroradiometer Monitoring Network was established by the U.S. National Science Foundation (NSF) in 1988 in response to predictions of increased ultraviolet (UV) radiation in the polar regions. It is the first automated, high-resolution UV scanning spectroradiometer network installed in the world. The network consists of five automated, high-resolution spectroradiometers, placed in strategic locations in Antarctica and the Arctic, and one established in San Diego, to collect data and serve as a training and testing facility. The network, which makes measurements of UV spectral irradiance, has been successfully operated in the harshest environments of Antarctica and the Arctic. It is currently returning data to researchers studying the effects of ozone depletion on terrestrial and marine biological systems, as well as being used to develop and verify models of atmospheric light transmission.

I-54840

Sikorski, R.J., Sigleo, A.C., Neale, P.J., **Spectral measurements of ultraviolet and visible solar irradiance at the Weddell-Scotia Confluence during 1993 austral spring,** *Antarctic journal of the United States,* 1994, 29(5), p.270-272, 2 refs.

Spectral measurements were made of incident and undersea solar irradiance in the Oct. and Nov. 1993 austral spring, during transits of a low ozone "hole" over the Weddell-Scotia Confluence. Meteorological data, hydrologic data, and ship pitch-and-roll data also were collected. TOMS satellite imagery indicated that the region of low atmospheric ozone concentrations, the austral spring ozone hole over the Antarctic, rotated and oscillated during the time of this research cruise. The 304-nm/344-nm ratio varied smoothly with the diel change in optical path length through the atmosphere, and the ratio was not greatly perturbed by changes in cloud cover. On the other hand, irradiance at 344 nm was strongly affected by changing cloud cover, and the maximum daily value varied from 10 to 45 microwatts/cm^2/nm.

I-54845

Stearns, C.R., Sinkula, B.B., **Antarctic weather forecasting: 1993,** *Antarctic journal of the United States,* 1994, 29(5), p.284, 3 refs.

The University of Wisconsin Space Science and Engineering Center provided daily weather forecasts for the cruises of the R/V *Nathanial B. Palmer,* R/V *Polar Duke* and *Polar Star* and for Palmer Station during 1993. The most recent weather information available at the Space Science and Engineering Center is the satellite-composite infrared imagery from four geostationary satellites (Meteosat-3, Meteosat-4, GOES-7, and GMS) and two polar-orbiting satellites (NOAA-11 and NOAA-12). Composite imagery, constructed every 3 hours, extends from the South Pole to 40°S and provides an overview of the cloud systems around Antarctica.

I-54846

Stearns, C.R., Holmes, R.E., Sinkula, B.B., **2 June 1993 storm,** *Antarctic journal of the United States,* 1994, 29(5), p.285-287, 2 refs.

A severe wind storm struck McMurdo Station between 1800 UTC June 1 and 1800 UTC June 2, 1993 causing extensive damage. Presented here are some of the observations from the automatic weather station (AWS) sites on the Ross Ice Shelf and near Ross I., some of which suffered damage to the wind systems and antennas. The locations of the AWS sites are given in figures.

I-54847

Stearns, C.R., Young, J.T., **Antarctic Meteorological Research Center: 1993,** *Antarctic journal of the United States,* 1994, 29(5), p.288-289, 2 refs.

The goal of the Antarctic Meteorological Research Center (AMRC) is "one-stop shopping" for antarctic meteorological data. The AMRC at the Crary Lab in McMurdo is designated as McM-AMRC and the AMRC at the University of Wisconsin is designated as UW-AMRC. The data presently available at the UW-AMRC are as follows: LAC data from julian day 348, 1992 to julian day 022, 1994, incomplete; SCIRI data from Nov. 1, 1992 to the present, incomplete; AWS data from Jan. 1980 to present; National Meteorological Center global gridded analysis from Jan. 1993 to present; and antarctic soundings from 1991 to 1993.

I-54848

Parish, T.R., Bromwich, D.H., **Large-scale surface pressure changes over Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.289-290, 4 refs.

Large-amplitude changes in surface pressure on the order of 15 hectopascals (hPa) occur regularly over Antarctica. Seasonal pressure changes are most dramatic during the early winter period of Feb. to Apr. and austral springtime period of Sep. to Dec. The timing of such surface pressure changes appears related to the annual course of the katabatic wind circulation. It is concluded that the mass transport between Antarctica and the subpolar latitudes is controlled in large part by a meridional circulation. The katabatic wind regime is a significant component of the lower branch of the meridional circulation and appears to be tied to the prevailing large-scale conditions. The apparent close connection of the continental discharge via organized katabatic winds with the ambient environment is currently being examined using 12-hour analyses.

I-54849

McNider, R.T., Goodrick, S.L., **Modeling the coupled ocean—katabatic wind systems of the Antarctic,** *Antarctic journal of the United States,* 1994, 29(5), p.291-292, 9 refs.

This paper reports on preliminary model studies of the coupling between antarctic katabatic flows and the coastal ocean. Although considerable past work in coupling large-scale and low-order ocean/atmosphere models has been done, relatively less work on coupling true mesoscale multidimensional models containing high-resolution boundary layers has been undertaken. This article describes a coupled atmosphere/ocean model which has been developed from the frameworks of a mesoscale atmospheric model and a coastal ocean model.

I-54850

Liu, Z., Bromwich, D.H., **Satellite investigation of spring cloud cover in West Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.293-295, 16 refs.

Combining the current cloud analysis and related discussion leads to the conclusion that synoptic forcing is indeed a significant factor influencing the katabatic wind regime in West Antarctica. Poleward-moving and warm, moist maritime air masses bring in moisture in the form of clouds and precipitation. A heat balance study in East Antarctica shows that a more positive radiation budget accompanies increased cloudiness. Therefore, warmer surface temperatures result from more clouds. The revealed differential cloud distribution affects the distribution of the surface temperatures, which in turn affect the structure of the drainage flow.

I-54851

Du, Y., Bromwich, D.H., Parish, T.R., **Influence of synoptic-**

scale cyclones on summer surface winds in the Siple Coast confluence zone, West Antarctica, *Antarctic journal of the United States,* 1994, 29(5), p.296-298, 10 refs.

One of the most marked confluence zones around the continental periphery of Antarctica is located over the Siple Coast area of West Antarctica. This model study focuses on the influence of synoptic forcing on the summertime wind field within the Siple Coast confluence zone. The model employed to simulate the antarctic surface winds is a three-dimensional hydrostatic mesoscale primitive equation model.

I-54852

Carrasco, J.F., Bromwich, D.H., **Survey of mesoscale cyclonic activity near McMurdo Station, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.298-301, 16 refs.

Synoptic-scale climatology shows that a surface cyclonic circulation prevails over the Ross Ice Shelf/Ross Sea region throughout the year. Here, the authors present the results of a survey of the mesoscale cyclonic circulation affecting the northwestern side of Ross Ice Shelf, specifically the area between Ross I. and Minna Bluff. It is found that the mesoscale cyclonic circulation near McMurdo Station seems to be associated either with a southward or northward propagation of a subsynoptic-scale surface trough that respectively develops either over the southwestern Ross Sea or near Byrd Glacier. These troughs are sometimes linked to a mesoscale cyclone present near Terra Nova Bay or Byrd Glacier. The interannual variability is a consequence of the interannual variability of the large-scale pattern.

I-54853

Neff, W.D., **Studies of variability in the troposphere and atmospheric boundary layer over the South Pole: 1993 experimental design and preliminary results,** *Antarctic journal of the United States,* 1994, 29(5), p.302-304, 10 refs.

A wind profiler was installed in Nov. 1992, southeast of the clean air facility (CAF) at the Amundsen-Scott Station. Wind profiler technology at the South Pole has proved most useful for periods of rapid warming of the lower atmosphere, even at very low temperatures, and during the high wind conditions under which doppler sodars normally fail because of wind-induced noise.

I-54854

Neff, W.D., **Decadal change in the troposphere and atmospheric boundary layer over the South Pole,** *Antarctic journal of the United States,* 1994, 29(5), p.304-306, 7 refs.

The atmosphere over the South Pole has shown strong variability at decadal timescales, distinct trends in surface lapse rate, and delays of almost a month in the time of formation of the thermal tropopause over the South Pole during the period from 1961 to 1994. It is suggested that explanations for the changes in the surface lapse rate will likely depend on a more detailed analysis of data obtained during the austral winter of 1993.

I-54855

Lubin, D., Chamberlin, R., Harper, D.A., **Cloud detection in satellite imagery over the South Pole,** *Antarctic journal of the United States,* 1994, 29(5), p.307-309, 10 refs.

On the premise that the atmospheric energy budget and surface temperature fields are strongly influenced by cloud cover, and given that general circulation models exhibit errors at high latitudes, the importance of taking advantage of unique satellite data sets to refine the understanding of the physics of antarctic climate, and to develop improvements to the general circulation models, is stressed.

I-54856

Saxena, V.K., **Cloud-mediated enhancement of cloud condensation nuclei at Palmer Station: a natural antigreenhouse mechanism,** *Antarctic journal of the United States,* 1994, 29(5), p.309-312, 13 refs.

A case study is presented of cloud-mediated production of cloud condensation nuclei (CCN) recorded by the Fukuta-Saxena CCN Spectrometer at Palmer Station in Jan. and Feb., 1994. Four instances of CCN bursts occurred when cloud base descended to the surface and dissipated under prevailing meteorological conditions. It is suggested that the objective of this paper is not to speculate on the sources of the observed enhanced CCN concentration but to merely report the conditions under which the phenomenon occurred.

I-54857

Berresheim, H., Eisele, F.L., Tanner, D.J., Jefferson, A., **Atmospheric sulfur and hydroxyl radical measurements at Palmer Station,** *Antarctic journal of the United States,* 1994, 29(5), p.312-315, 12 refs.

In Jan. and Feb. 1994, project SCATE (sulfur chemistry in the antarctic troposphere experiment) was conducted at Palmer Station with the goal of obtaining a comprehensive database for modeling atmospheric sulfur chemistry in high latitudes. Most of the equipment was set up as far away as possible (200 m) from the station's local pollution sources. An overview of the most important parameters measured is given in a table. The SCATE study uniquely combined for the first time measurements of all of the indicated sulfur compounds in Antarctica, including real-time measurements of OH, H_2SO_4, MSA (gas), and $DMSO_x$ (=DMSO, $DMSO_2$). Due to the early stage of data evaluation only some selected preliminary results are discussed here.

I-54858

Allison, I., Moritz, R.E., **Sea ice in the global climate system: requirements for an ocean observing system,** Texas A&M University. Ocean Observing System Development Panel. Background report No.7, College Station, Apr. 1995, 28p., 81 refs.

DLC GB2401.72.R42 A38

Focusing on both arctic and antarctic regions, this study examines the effects of sea ice distribution and thickness on climatic variations, with emphasis on the acquisition of ice condition data from remote sensing modalities including drift buoys and satellites. The influence of variations in sea ice parameters on global climatic change and forecasting is emphasized, and the description and implementation of the relevant sensor instruments is discussed.

I-54887

Joseph, J.E., ***Mac Weather:* improved meteorological support in Antarctica,** Symposium on Antarctic Logistics and Operations, 6th, Rome, Italy, 1994. Proceedings, [1994], p.349-352.

McMurdo Weather Office of the US Naval Support Force, Antarctica (locally known as "Mac Weather") has had to derive operational forecasts using tools which were dependent on limited communication links and processing gear. Some data sources and valuable forecast guidance were simply inaccessible until recently. In the last few years, there have been many improvements in the McMurdo communications architecture. With the introduction of Internet, satellite telephone capability, advances in processing gear and upgrades in software, the antarctic forecaster is no longer isolated from forecasting tools commonly available at other weather centers.

I-54898

Hamill, P., Tabazadeh, A., Kinne, S., Toon, O.B., Turco, R.P., **On the growth of ternary system $HNO_3/H_2SO_4/H_2O$ aerosol particles in the stratosphere,** *Geophysical research letters,* Apr. 1, 1996, 23(7), p.753-756, 12 refs.

The authors present a study of the growth of ternary solution (nitric acid, sulfuric acid and water) droplets in the stratosphere. The growth mechanism is heteromolecular condensation in which the particle is assumed to be in equilibrium with environmental water vapor. Model results are in reasonable agreement with the averaged extinction ratio obtained by the SAM II satellite system. (Auth. mod.)

I-54905

Van Allen, R., Murcray, F.J., Liu, X., **Mid-infrared measurements of the atmospheric emission over the South Pole using a radiometrically calibrated Fourier transform spectrometer,** *Applied optics,* Mar. 20, 1996, 35(9), p.1523-1530, 24 refs.

The authors conducted year-round measurements of the downwelling atmospheric infrared emission over the South Pole in 1992. The instrument covered the 550-1600 wave-number region with 1 wave-number resolution. The water vapor content for clear-sky cases was calculated and showed a good correlation with the surface temperature, with values ranging from 0.2 to 0.8 mm. Ozone-sonde profiles were compared with total column abundances of O_3 retrieved from the spectra. The experiment is explained in detail, including the instrumentation, calibration, and retrieval methods used. The calibrated spectra include information about several trace gases, water, clouds, temperature, profiles, and aerosols. (Auth. mod.)

I-54906

Cheng, D.J., De Zafra, R.L., Trimble, C., **Millimeter wave spectroscopic measurements over the South Pole. 2. An 11-month cycle of stratospheric ozone observations during 1993-1994,** *Journal of geophysical research,* Mar. 20, 1996, 101(D3), p.6781-6793, 24 refs.

A quasi-continuous record of ozone profiles throughout the stratosphere over the South Pole has been obtained over an 11-month cycle from Feb. 1993 to Jan. 1994. This record includes the first winter measurements of ozone profiles in the altitude region above ≈30 km. Observations were made approximately every 3 days, using a high-sensitivity millimeter-wave spectrometer to quantitatively measure the pressure-broadened ozone rotational emission line at 276.923 GHz. Vertical mixing ratio profiles have been derived from pressure-broadened lineshapes by a deconvolution technique. Descent rates determined from ozone isopleths in the midstratosphere (25 to 35 km) are shown to be in good agreement with recent model estimates of downward transport in the winter vortex, and with the mid to lower stratospheric descent rate inferred from other South Pole measurements of N_2O. Total column measurements are in generally good agreement with those derived from a Dobson photospectrometer at the pole and from local ozonesonde measurements. All three indicate there was no significant increase in total ozone over the pole during the winter of 1993. (Auth. mod.)

I-54922

Matsuki, H., Yoshikawa, K., Yanagisawa, Y., Kasuga, H., **Measurement of atmospheric NO_2 concentration in Antarctica using NO_2 filter badge and tube,** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.121-134, 14 refs.

The areas surveyed were the Patriot Hills on the coast of the Weddell Sea and the route from there to the South Pole, along 80°W longitude, from Nov. 1992 to Feb. 1993. The survey revealed that the antarctic atmosphere is considerably polluted by NO_2, with concentrations ranging from 110 to 2.8 ppb. Another important finding was that the atmospheric NO_2 concentration increased with proximity to the South Pole, supporting the theory that atmospheric circulation converges in the polar regions. The instruments, selected for convenience of transportation, were a small, light and easy-to-handle NO_2 tube and filter badge, which are described. (Auth. mod.)

I-54923

Matsunaga, K., Osada, K., Iwasaka, Y., Murai, Y., Yoshikawa, K., **Volatile organic matter adsorbed on Tennax GR during the Antarctic Walk Expedition (Preliminary report),** Scientific results from the Antarctic Walk Environmental Research Expedition 1991-1993, edited by K. Yoshikawa, K. Harada and S. Ishimaru, Tokyo, Antarctic Environmental Research Expedition Organizing Committee, 1995, p.135-140, 5 refs.

Volatile organic substances are important participants in the photochemical reaction of the atmosphere. Oxygenated species are large sources of HOx ($OH+HO_2$) radicals, resulting in increased ozone production. The knowledge of their large scale distributions can be used to improve understanding of atmospheric transport processes and are important to validate model predictions. In this paper, the authors present preliminary results from measurements of several light hydrocarbons and the oxygenated species for samples collected at Patriot Hills and during a traverse from there to the South Pole.

I-54957

Liubarskiĭ, A.N., **Impact of Antarctica on surface air temperatures in the southern polar region** [Vliianie Antarktidy na prizemnuiu temperatury vozdukha iuzhnoĭ poliarnoĭ oblasti], *Antarktika,* 1993, No.32, p.11-21, In Russian with English summary. 17 refs.

The impact of physical and geographical conditions on the statistical structure of the southern polar region (SPR) temperature fields has been considered. To estimate this impact, an approach based on the selection of the type and parameters of the correlation function with different distances has been proposed. The analysis of spatial statistical structure of antarctic temperature fields has been made by means of characteristics of uniformity, stability and predictability allowing the relationship between the temperature and physical and geographical conditions to be established. It has been revealed that antarctic orography and the ice sheet both influence the temperature of the air. At the same time, zones with an extreme energy emission in the southern ocean affect the changes in the spatial correlation radius in warm and cold periods. (Auth.)

I-54958

Sakunov, G.G., Barteneva, O.D., Kozlov, V.P., **Light dispersion and horizontal transparency in the surface boundary layer of the polar regions** [Ob osobennostiakh rasseianiia sveta i gorizontal'noĭ prozrachnosti v prizemnom sloe atmosfery poliarnykh raĭonov], *Antarktika,* 1993, No.32, p.22-35, In Russian with English summary. 9 refs.

The mean light dispersion indices in the absence of meteorological phenomena and in dense haze are presented from measurements in the surface boundary layer in the Arctic and Antarctic. The connection between the type of dispersion indices and the horizontal transparency of the atmosphere is investigated. A small parameter model for the analytical approximation of dispersion indices with a uniform accuracy of about 10% is proposed. (Auth.)

I-54973

Bowman, K.P., **Rossby wave phase speeds and mixing barriers in the stratosphere. Part 1: observations,** *Journal of the atmospheric sciences,* Mar. 15, 1996, 53(6), p.905-916, 29 refs.

Lagrangian trajectories are used to calculate isentropic mixing properties for unfiltered and filtered Southern Hemisphere stratospheric winds. In wintertime, significant mixing is confined to the surf zone between the tropics and the edge of the antarctic polar vortex. The mixing barrier at the edge of the vortex is located near the core of the polar jet stream (where the maximum wind speeds occur), which is also approximately where the meridional potential vorticity gradient is largest. In summer there is significant mixing throughout the hemisphere, and no high-latitude mixing barrier exists. The presence of the mixing barrier around the polar vortex can be interpreted as a result of the lack of waves with fast phase speeds comparable to the speed of the jet. Artificially amplifying the fast-moving waves can destroy the mixing barrier around the vortex. In summer, when winds are weaker, waves break throughout the hemisphere and the mixing barrier disappears. (Auth. mod.)

I-54975

Bodeker, G.E., Scourfield, M.W.J., **Planetary waves in total ozone and their relation to antarctic ozone depletion,** *Geophysical research letters,* Nov. 1, 1995, 22(21), p.2949-2952, 24 refs.

Recent studies have demonstrated the versatility of the Total Ozone Mapping Spectrometer (TOMS) data set in characterizing the behavior of Rossby-gravity waves. Similar analyses performed here are extended to relate interannual differences in Southern Hemisphere mid-latitude wave activity to the severity of the antarctic ozone depletion. Total ozone wave powers for wavenumber 1 to 6 have been calculated from TOMS distributions for each day from 1979 to 1992 and a mean measure of antarctic ozone depletion has been determined for each year. After normalization with respect to stratospheric chlorine loading, interannual differences in the severity of the antarctic ozone hole are anti-correlated with total wave powers. Furthermore, wintertime mean wave power and polar stratospheric temperatures are well correlated and appear to lag the equatorial Quasi-biennial Oscillation by 1 year. (Auth. mod.)

I-54999

Matsuhara, K., Kojo, Y., Kishi, T., Igarashi, H., Higashijima, K., **Meteorological observations at Syowa Station in 1992 by the**

33rd Japanese Antarctic Research Expedition, *Antarctic record,* Nov. 1995, 39(3), p.264-302, In Japanese with English summary. 7 refs.

Results of meteorological observations carried out by JARE-33 from Feb. 1, 1992 to Jan. 31, 1993 at Showa Station are described. Blizzards were encountered 28 times spanning 60 days; two blizzards continued over 100 hours. During most of the time, it was cloudy and windy. Annual mean wind speed was 7.1 m/s, mean vapor pressure was 2.4 hPa, and mean cloud amount was 7.5. All of these values were maximum records. The antarctic ozone hole was observed for four successive years. The lowest value of daily total ozone amount was 140 m atm-cm on Oct. 4 and the lowest of monthly mean was 164 m atm-cm in Oct. Both were the lowest values on record. (Auth. mod.)

I-55018

McCold, L.N., Eddlemon, G.K., Blasing, T.J., **Environmental effects of the US Antarctic Program's use of balloons in Antarctica,** *U.S. Department of Energy. Report,* June 1995, ORNL/TM-13032, 76p., DE96 000853, Refs. p.56-57.

The USAP uses balloons in Antarctica to conduct scientific research, to facilitate safe air transport, and to provide data for global weather predictions. However, there is the possibility that balloons or their payloads may adversely affect antarctic fauna or flora. The purpose of this study is to provide background information upon which the USAP may draw when complying with its responsibilities under the National Environmental Policy Act of 1969, the Antarctic Treaty, and the Madrid Protocol. (Auth.)

I-55028

Stevens, P.S., Anderson, J.G., **Kinetic measurements of the ClO + $O_3 \rightarrow ClOO + O_2$ reaction,** *Geophysical research letters,* Aug. 1990, 17(9), p.1287-1290, 20 refs.

Upper limits for the bimolecular rate constant for the reaction ClO + $O_3 \rightarrow ClOO + O_2$ have been measured directly between 233 and 413 K using a discharge-flow system at 1-2 torr total pressure. Production of ClO (which occurs quickly after thermal decomposition of ClOO in the presence of O_3) was detected using laser magnetic resonance spectroscopy, and distinguished from the reactant ClO through isotopic oxygen labelling. The experimental conditions were modelled using a kinetic simulation program to show that chemical and isotopic scrambling interferences were negligible. From the results, it is concluded that this bimolecular reaction does not contribute significantly to the observed ozone depletion within the antarctic vortex. (Auth. mod.)

I-55029

Smith, R.H., **Formation of nitric acid hydrates—a chemical equilibrium approach,** *Geophysical research letters,* Aug. 1990, 17(9), p.1291-1294, 13 refs.

In an examination of polar stratospheric cloud formation, published data are used to calculate equilibrium constants for the reactions $HNO_3.3H_2O(s) <-> HNO_3(g) + 3H_2O(g)$ and $HNO_3.H_2O(s) <-> HNO_3(g) + H_2O(g)$ over the temperature range 190 to 205 K. Standard enthalpies of formation and standard entropies are calculated for the tri- and monohydrates. These are shown to be in reasonable agreement with earlier calorimetric measurements. The formation of nitric acid trihydrate in the polar stratosphere is discussed in terms of these equilibrium constants. (Auth. mod.)

I-55031

Demore, W.B., **Equilibrium constant for the reaction of ClO + O_2 <-> ClO.O_2,** *Geophysical research letters,* Dec. 1990, 17(12), p.2353-2355, 6 refs.

In an attempt to model polar stratospheric cloud decomposition, photolysis of $Cl_2/Cl_2O/O_2$ mixtures at 197 K has been used to place an upper limit of $4 \times 10^{-18}/cm^3$ on the equilibrium constant for the ClO + O_2 <-> ClO.O_2 reaction at that temperature. This value is three orders of magnitude below the current NASA recommendation. (Auth. mod.)

I-55032

Parr, A.D., Wayne, R.P., Hayman, G.D., Jenkin, M.E., Cox, R.A., **Pressure dependence of the reaction between ClO and OClO at 226K,** *Geophysical research letters,* Dec. 1990, 17(12), p.2357-2360, 21 refs.

The reaction between ClO and OClO has been studied using the molecular modulation technique at 226K over the pressure range 4.8-29.0 torr. The reaction has a strong pressure dependence and the thermolecular rate constant obtained at this temperature is $k_1 = (2.8 \pm 2.2) \times 10^{-31}$ cm^6/molecule^2/s. The importance of the reaction is discussed in the context of the large ozone depletions observed in the antarctic springtime. An explanation for the unexpected behavior observed in earlier studies of the OClO/NO_2 system is also given. (Auth. mod.)

I-55034

Seisel, S., **Heterogeneous reactions of N_2O_5 and HBr and their influence on ozone depletion in the polar stratosphere** [Heterogene Reaktionen von N_2O_5 und HBr und ihr Einfluß auf den Ozonabbau in der polaren Stratosphäre], *Berichte zur Polarforschung,* 1996, No.193, 102p., In German with English summary. Refs. p.96-101.

Heterogeneous reactions of dinitrogenpentoxide (N_2O_5) and nitric acid ($HONO_2$) with hydrogen bromide (HBr) were studied to learn about the products and mechanisms of these reactions. The homogeneous gas phase reaction of $HONO_2$ with HBr was also investigated. The investigations of the heterogeneous reactions were performed at temperatures below 200 K, analyzing simultaneously the solid phase by means of FTIR-spectroscopy and the gas phase by mass spectrometry. The characterization of the individual compounds was in good agreement with literature data. Observed differences were due to the different temperatures used in this investigation. The uptake of HBr on ice and nitric acid trihydrate (NAT) resulted in a dissociation of HBr on both surfaces. The heterogeneous reaction of N_2O_5 with HBr was studied on N_2O_5, ice and NAT surfaces. The reaction started at temperatures above 165 K. The observed reaction products were nitric acid monohydrate (NAM) in the solid phase, molecular bromine (Br_2) and nitric oxide (NO) in the gas phase. A further product showing a doublet in the FTIR spectrum at 1865/cm and 1894/cm was positively identified as nitrosyl bromide (BrNO). Variation of the reactant concentrations led to some observations which allowed conclusions about the mechanism of this reaction. At low HBr concentration nitrous acid (HONO) was detected in the gas phase. Furthermore N_2O_5 was always in its ionic form NO_2+NO_3-. (Auth. mod.)

I-55043

Gruzdev, A.N., Sitnov, S.A., **Analysis of the annual variation of tropospheric and stratospheric ozone derived from ozonesonde data,** *Izvestiya. Atmospheric and oceanic physics,* Feb. 1995, 30(4), p.461-470, Translated from Fizika atmosfery i okeana. 27 refs.

A comprehensive analysis of annual variations in the latitude-height field of ozone mixing ratios is performed on the basis of ozone soundings at 28 stations in the world ozone-measuring network. Using different characteristics of annual variation and applying various methods of analysis, peculiarities and common features of intraannual evolution are revealed in the middle and lower stratosphere, free troposphere, and atmospheric boundary layer in the Arctic, Antarctic, middle and subtropical latitudes of the Northern Hemisphere, and mid-latitudes of the Southern Hemisphere. Essential differences in ozone intraannual evolution between the Arctic and the Antarctic are noted and possible mechanisms are discussed. An estimate of the cross-tropopause ozone flux responsible for the large increase in the tropospheric ozone content in the Northern Hemisphere extratropical latitudes in Mar.-Apr. is obtained. (Auth.)

I-55045

Wang, L.C., Clary, D.C., **Time-dependent wave-packet studies on the sticking of HCl to an ice surface,** *Journal of chemical physics,* Apr. 8, 1996, 104(14), p.5663-5673, 64 refs.

A molecular dynamics simulation of polar stratospheric chemical processes with a mixed time-dependent quantum-classical treatment is carried out for the adsorption of HCl on the (0001) surface of ice. All six coordinates of the HCl molecule are considered with two important coordinates, the vibrational coordinate *r* of HCl and the distance Z between the center of mass of HCl and the ice surface, treated quantally by a grid method with absorbing boundaries. The other coordinates of HCl and all coordinates of the water molecules of ice are treated classically except the intramolecular vibrational motions which are frozen. The results show that treating the two coordinates *r* and Z quantally is necessary in order to describe the adsorption accurately. The interaction spectra as well as other detailed dynamical information from the simulation are presented. An adsorption energy of 25 kJ/mol is obtained and compared with previous calculation and experiments. The energy transfer between HCl and the ice surface is also calculated. An effort is made to probe the effects of defects of the ice surface on the HCl scattering process. (Auth. mod.)

I-55046
Centro Ricerca e Documentazione Polare, Rome, **Polar news/ Notizie polari, Vol.11, No.3,** 1996, p.15-21, In Italian and English.

The only article pertinent to Antarctica in this issue deals with sudden climatic warmings as recorded in ice cores from Vostok Station and Greenland. It is pointed out that researchers observe that only the warming events lasting more than 2000 years in Greenland, and corresponding to a warming of 2°C, are recorded in Antarctica as well.

I-55050
Taalas, P., **Factors affecting the behaviour of tropospheric and stratospheric ozone in the European Arctic and in Antarctica,** *Finnish Meteorological Institute. Contributions,* 1993, No.10, 31p., 9 refs.

Three papers dealing with new ozone observations made in the European Arctic and at the Antarctic Peninsula since 1987 are reviewed. An update including the year 1992 is also made. Total ozone and ozone sounding observations made in the European Arctic and in Antarctica in 1987-92 and meteorological sounding observations made at Sodankylä, Finland in 1965-92 have been studied. No regular ozone soundings had been performed in the European Arctic and on the Antarctic Peninsula prior to 1988. Ozone observations have been interpreted using global analysis fields from the European Centre for Medium Range Weather Forecasts. These allow one to calculate potential vorticity maps and three-dimensional trajectories. The use of such tools in ozone research is a recent development. Pronounced stratospheric ozone loss has been observed in Antarctica in springtime, and this loss has become accentuated since 1987. No similar loss has been observed in the European Arctic, although large negative anomalies of short duration have been detected. Interhemispheric comparison of the behavior of tropospheric ozone at high latitudes has revealed that the spring peak of tropospheric ozone in the Northern Hemisphere is most probably caused by general photochemical activation of nitric and hydrocarbon compounds. (Auth. mod.)

I-55065
Chatterjee, M., **Evolution of the boundary layer over the southern ocean,** *Indian National Science Academy. Proceedings,* Jan. 1994, 60(A1), p.121-132, 17 refs.

DLC Q73.I774a

An analytical model has been developed for investigating the temporal variation of the marine boundary layer over the Indian Ocean sector of the southern ocean surrounding Antarctica. The model inputs were provided from sparse data collected during the Indian expeditions to Antarctica. It is suggested that in spite of the basic simplicity of the model and the inadequacy of the available data, the model reproduces the boundary layer characteristics fairly well. The results are presented in this paper. (Auth.)

I-55066
Kelkar, R.R., **Satellites for monitoring climate change: the emerging scenario,** *Indian National Science Academy. Proceedings,* Jan. 1994, 60(A1), p.335-348, 21 refs.

DLC Q73.I774a

Although in the last few years, large-scale utilization of satellite data has become possible for climate studies, there is also an increasing realization of the limitations of the processes by which information from meteorological satellites is being converted to a climate-scale database. This has led meteorologists and satellite planners to think very seriously about using modified or totally new wavelength channels, increasing the number of channels of radiometers, improving the resolutions, trying new orbits, etc. Some of these plans are very ambitious and if brought into reality, they are likely to completely alter the satellite scenario by the turn of the century. This paper first reviews the current status of various on-going programs and efforts and then describes the new possibilities that are opening up, based upon the plan projections of various countries available presently. Data on the antarctic ozone hole and snow cover are included. (Auth. mod.)

I-55067
Clary, D.C., **Molecules on ice,** *Science,* Mar. 15, 1996, 271(5255), p.1509, 9 refs.

Following a review of progress made since 1985 in understanding the chemical processes leading to atmospheric ozone depletion, the author comments on a computer model recently developed at the University of Colorado, showing how HCl sticks to ice. He concludes that this sequence of events provides a good example of how an applied problem can stimulate basic research in the laboratory and on the computer.

I-55068
Gertner, B.J., Hynes, J.T., **Molecular dynamics simulation of hydrochloric acid ionization at the surface of stratospheric ice,** *Science,* Mar. 15, 1996, 271(5255), p.1563-1566, Numerous refs.

Molecular dynamics simulations were used to study the acid ionization of hydrochloric acid (HCl) at the basal plane surface of ice at 190 K, as a model for the acid ionization process in antarctic polar stratospheric clouds (PSCs). Initial conditions for HCl placement within the top bilayer of the ice lattice were selected on the basis of relevant dynamic equilibrium adsorption-desorption conditions. Free energy changes calculated for the first step in the stepwise acid ionization mechanism ranged from -5.8 to -6.7 kilocalories per mole for various likely initial conditions. These results indicate that acid ionization is thermodynamically favorable and that this process has important implications for ozone depletion mechanisms involving PSCs. (Auth.)

I-55074
Ragaini, E., **Measurements and parameter estimation of clear air and sea echoes in MST radars,** IEEE Instrumentation/Measurement Technology Conference. IMTC Proceedings. Integrating Intelligent Instrumentation and Control, Waltham, MA, Apr. 24-26, 1995, New York, 1995, p.466-471, 4 refs.

DLC TK7878.I3295 1995

Wind profiling is a rather recent application of Doppler radars to atmospheric sounding. Wind profilers provide information on wind speed and on turbulence at different heights by means of analysis of clear air echoes. When a wind profiler is installed near the sea, clutter due to echoes backscattered by the sea surface is also received, which can heavily affect measurements. In the present work, a parameter estimation technique which can be used to deal with this problem is discussed. The author also shows some results of its application to data measured by an MST radar installed at King George I., where both atmospheric and ocean echoes are present. The processing capabilities needed to implement this technique can be obtained from a PC connected to the measurement system. (Auth.)

I-55078
Meilinger, S.K., et al, **Size-dependent stratospheric droplet composition in lee wave temperature fluctuations and their potential role in PSC freezing,** *Geophysical research letters,* Nov. 15, 1995, 22(22), p.3031-3034, 12 refs.

Rapid temperature fluctuations are shown to cause liquid $H_2SO_4/HNO_3/H_2O$ stratospheric aerosols to depart considerably from thermodynamic equilibrium. While HNO_3 uptake by larger droplets is diffusively hindered, small droplets can approach the composition of a pure binary HNO_3/H_2O solution with up to 52 wt% HNO_3, 48 wt% H_2O and very small amounts of H_2SO_4. The stoichiometry of these droplets is close to that of nitric acid trihydrate (NAT) and freezing experiments suggest that this could be a suitable pathway for the formation of frozen polar stratospheric clouds (PSCs) of type Ia. (Auth.)

I-55086
Warren, S.G., **Antarctica,** Encyclopedia of climate and weather, Vol.1. Edited by S.H. Schneider, New York, Oxford University Press, 1996, p.32-39, 3 refs.

DLC QC854.E523

This brief encyclopedia entry synopsizes meteorological factors which govern the antarctic climate.

I-55089

Hall, T.M., **Ozone hole,** Encyclopedia of climate and weather, Vol.2. Edited by S.H. Schneider, New York, Oxford University Press, 1996, p.569-573, 5 refs.

DLC QC854.E523

This encyclopedia entry describes the atmospheric dynamics which generate the antarctic ozone hole and analyzes its climatic significance.

I-55091

Lahoz, W.A., et al, **Vortex dynamics and the evolution of water vapour in the stratosphere of the southern hemisphere,** *Royal Meteorological Society. Quarterly journal B,* Jan. 1996, 122(530), p.423-450, 24 refs.

The seasonal evolution of water vapor in the stratosphere of the Southern Hemisphere is studied by using water vapor measurements made by the Microwave Limb Sounder on the Upper Atmosphere Research Satellite. This evolution is interpreted with the aid of meteorological fields produced at the UK Meteorological Office by data assimilation. The processes governing the distribution of water vapor are clarified by focusing on the physical and dynamical conditions in and around the antarctic stratospheric polar vortex. Sustained diabatic descent in the vortex causes isopleths of water vapor mixing ratio to dip down markedly in the polar vortex, strengthening radial gradients of water vapor in the westerly jet, while stretching and folding of material lines in anticyclones adjacent to the polar vortex leads to a widening zone of weak horizontal gradients of water vapor. The circulation is discussed in terms of the dynamics of interacting vortices. Two different flow regimes are identified: (a) mid and late southern winter, with a strong polar vortex and one or more eastward-travelling anticyclones; and (b) spring, with a relatively weak polar vortex and a quasi-stationary anticyclone. The phenomenon of merger of anticyclones, already observed in the stratosphere of the Northern Hemisphere, is documented for the Southern Hemisphere. (Auth. mod.)

I-55093

Garratt, J.R., Prata, A.J., **Downwelling longwave fluxes at continental surfaces—a comparison of observations with GCM simulations for the global land-surface radiation budget,** *Journal of climate,* Mar. 1996, 9(3), p.646-655, 21 refs.

Previous work suggests that general circulation (global climate) models have excess net radiation at land surfaces, apparently due to overestimates in downwelling shortwave flux and underestimates in upwelling longwave flux. Part of this excess, however, may be compensated for by an underestimate in downwelling longwave flux. Long term observations of the downwelling longwave component at several land stations in Europe, the United States, Australia and Antarctica suggest that climate models (four are used, as in previous studies) underestimate this flux component on an annual basis by up to 10 W/m^2, yet with low statistical significance. It is probable that the known underestimate in boundary-layer air temperature contributes to this, as would low model cloudiness and neglect of minor gases such as methane, nitrogen oxide, and the freons. The bias in downwelling longwave flux, together with those found earlier for downwelling shortwave and upwelling longwave fluxes, are consistent with the model bias found previously for net radiation. All annually averaged fluxes and biases are deduced for global land as a whole. (Auth.)

I-55097

Boutron, C.F., **Historical reconstruction of the earth's past atmospheric environment from Greenland and antarctic snow and ice cores,** *Environmental reviews,* 1995, 3(1), p.1-28, With French summary. 107 refs.

After a brief description of the antarctic and Greenland ice caps, an overview is given of the procedures used in the field for collecting snow and ice from the surface down to great depths, followed by a discussion of techniques used to date and analyze the samples. The main results obtained to date are then presented, with special emphasis on the very recent. The analysis of the snow and ice layers deposited during the past few centuries, especially since the Industrial Revolution, has allowed us to assess clearly the impact human activity has had on the atmosphere for important constituents such as heavy metals, sulfur and nitrogen compounds, greenhouse gases, carbon and organic compounds, and artificial radionuclides. The analysis of ancient ice up to several hundred thousand years old has provided unique insight into the past natural changes that affected the atmosphere during glacial-interglacial transitions, especially the temperature, greenhouse gases, soil- and sea-derived aerosols and heavy metals. (Auth. mod.)

I-55122

Prather, M., Midgley, P., Rowland, F.S., Stolarski, R., **Ozone layer: the road not taken,** *Nature,* June 13, 1996, 381(6583), p.551-554, 14 refs.

The threat to the global ozone layer posed by CFCs and related halocarbons, as epitomized by losses over Antarctica followed by similar losses over the arctic regions, has been dispelled because, since the early 1970s, the global community has followed a path of scientific understanding, public awareness, environmental activism and boycotts, national regulations, industry studies of CFC substitutes and, finally, an international agreement—the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. Without this sequence of events, which culminated first in restricted use of CFCs and later in a complete phase-out of these chemicals, ozone depletion would be worse than it is today and the global atmosphere would have been committed to a very different future over most of the next century. The authors compare the path they are now following—the amended Montreal Protocol and its implied future—with the most likely path of CFC growth and ozone depletion expected had not the CFC threat to the ozone layer been identified in 1974. (Auth. mod.)

I-55126

Carroll, J.J., **Observations and model studies of episodic events over the south polar plateau,** *Antarctic journal of the United States,* 1994, 29(5), p.322-323, 1 ref.

During the calendar year 1993, *in situ* measurements of winds, atmospheric and snow temperatures, and radiation components were made at Amundsen-Scott Station. As part of the same project, ground-based remote-sensing techniques were employed to measure vertical profiles of temperature and wind. These data were collected to identify and characterize the evolution of the atmospheric boundary layer during periods of significant warming near the ground.

I-55127

Van Allen, R., Murcray, F.J., **Infrared atmospheric absorption and emission studies,** *Antarctic journal of the United States,* 1994, 29(5), p.324-325, 3 refs.

The authors' experiments in Antarctica this season consisted of three separate efforts: continued atmospheric thermal emission measurements from Amundsen-Scott Station; high-resolution solar spectral measurements continued from Arrival Heights; and small balloon instruments, prepared for flights during the winter. The main thrust of this experiment was to collect atmospheric emission data during the austral winter to measure abundances of nitric acid vapor ozone, water vapor and other atmospheric gases, as well as absolute total radiance in the region 7-18 microns (550-1,500 Kaysers). Column abundances for HNO_3 and water vapor have been retrieved for 1992. A figure shows the seasonal change of HNO_3 compared to the 50 mb temperature. The critical temperatures for the formation of PSCs type I and type II are shown for reference.

I-55153

McIntyre, M.E., **Stratospheric polar vortex and sub-vortex: fluid dynamics and midlatitude ozone loss,** *Royal Society of London. Philosophical transactions. Series A. Physical sciences and engineering,* Aug. 15, 1995, 352(1699), Arctic and environmental change. Edited by P. Wadhams, J.A. Dowdeswell, and A.N. Schofield, p.227-240, 36 refs.

It has been suggested on the basis of certain chemical observations that the wintertime stratospheric polar vortex might act as a chemical processor, or flow reactor, through which large amounts of air—of the order of one vortex mass per month or three vortex masses per winter—flow downwards and then outwards to middle latitudes in the lower stratosphere. If such a flow were to exist, then most of the air involved would become chemically 'activated', or primed for ozone destruction, while passing through the low temperatures of the vortex where fast heterogeneous reactions can take place on polar-stratospheric-cloud particles. There could be serious implications here for the understanding of ozone-hole chemistry and for mid-latitude ozone loss, both in the Northern and in the Southern Hemisphere. This paper will briefly assess current fluid-dynamical thinking about flow through the vortex. It is concluded that the vortex typically cannot sustain an average throughput much greater than about a sixth of a vortex mass per month, or half a vortex mass per winter, unless a large and hitherto unknown mean circumferential force acts persistently on the vortex in an eastward or 'spin-up' sense, prograde with the Earth's rotation. By contrast, the 'sub-vortex' below pressure-altitudes of about 70 hPa (more precisely, on isentropic surface below potential temperatures of about 400 K) is capable of relatively large mass throughput depending, however, on tropospheric weather beneath, concerning which observational data are sparse. (Auth.)

I-55154

Stanhill, G., **Solar irradiance, air pollution and temperature changes in the Arctic,** *Royal Society of London. Philosophical transactions. Series A. Physical sciences and engineering,* Aug. 15, 1995, 352(1699), Arctic and environmental change. Edited by P. Wadhams, J.A. Dowdeswell, and A.N. Schofield, p.247-258, 42 refs.

A highly significant decrease in the annual sums of global irradiance reaching the surface of the Arctic, averaging 0.36 W/m^2 per year, was derived from an analysis of 389 complete site-years of measurement, beginning in 1950, at 22 pyranometer stations within the Arctic Circle. The smaller database of radiation balance measurements available showed a much smaller and statistically non-significant change. Reductions in global irradiance were most frequent in the early spring months and in the western sectors of the Arctic, coinciding with the seasonal and spatial distribution of the incursions of polluted air which give rise to the Arctic Haze. Irradiance measured in Antarctica during the same period showed a similar and more widespread decline despite the lower concentrations of pollutants. A marked increase in the surface radiation balance was recorded. Possible reasons for these interpolar anomalies and their consequences for temperature change are discussed. (Auth.)

I-55168

Jiang, Y., Yung, Y.L., Zurek, R.W., **Decadal evolution of the antarctic ozone hole,** *Journal of geophysical research,* Apr. 20, 1996, 101(D4), p.8985-8999, 73 refs.

Ozone column amounts obtained by the total ozone mapping spectrometer (TOMS) in the southern polar region are analyzed during late austral winter and spring for 1980-1991 using area-mapping techniques and area-weighted vortex averages. The principal results are: (1) there is a distinct change after 1985 in the vortex-averaged column ozone depletion rate during Sep. and Oct., the period of maximum ozone loss, and (2) the vortex-averaged column ozone in late Aug. (day 240) has dropped by 70 Dobson units in a decade due to the loss in the dark and the dilution effect. The authors interpret the year-to-year trend in the ozone depletion rate during the earlier part of the decade as due to the rise of anthropogenic chlorine in the atmosphere. The slower trend at the end of the decade indicates saturation of ozone depletion in the vortex interior, in that chlorine amounts in the mid-1980s were already sufficiently high to deplete most of the ozone in air within the isolated regions of the lower-stratospheric polar vortex. In subsequent years, increases in stratospheric chlorine may have enhanced wintertime chemical loss of ozone in the south polar vortex even before major losses during the antarctic spring. (Auth. mod.)

I-55192

Taalas, P., **On the behaviour of tropospheric and stratospheric ozone in northern Europe and in Antarctica 1987-90,** *Finnish Meteorological Institute. Contributions,* June 1992, No.8, 88p., Refs. p.81-88.

Recent and future changes in stratospheric and tropospheric ozone may have serious ecological and health effects. These changes are mainly caused by man-made emissions of nitric compounds, carbon monoxide, hydrocarbons and halogenated species. Total ozone and ozone sounding observations were made in the Arctic and in Antarctica in 1987-90. Interhemispheric comparisons of the behavior of tropospheric and stratospheric ozone at high latitudes showed the stratospheric ozone depletion to be considerably higher at southern than at northern latitudes. (Auth. mod.)

I-55210

Sinclair, M.R., **Local topographic influence on low-level wind at Scott Base, Antarctica,** *New Zealand journal of geology and geophysics,* 1988, Vol.31, p.237-245, 11 refs.

Measurements of wind and temperature at Scott Base and from a nearby elevated site are used to examine the relationship between the surface wind and the wind flow in the free air above the terrain. During stable conditions with temperature inversions, the surface wind at Scott Base is from the northeast for a wide range of flow directions above the terrain. This suggests that the Scott Base northeasterly results from deflection of the prevailing flow by local topography. During neutral or unstable temperature stratification, the surface wind may blow from other directions, and closely follows the direction of the flow above the topography. These results are consistent with simple physical arguments based on buoyancy considerations. (Auth.)

I-55219

Henson, B.F., Wilson, K.R., Robinson, J.M., **Physical adsorption model of the dependence of ClONO$_2$ heterogeneous reactions on relative humidity,** *Geophysical research letters,* May 1, 1996, 23(9), p.1021-1024, 26 refs.

The authors present a model of polar stratospheric cloud heterogeneous reactivity based on physical adsorption that describes the observed relative humidity dependence of the ClONO$_2$ reaction probability with H$_2$O and HCl on sulfuric acid tetrahydrate ice surfaces (SAT) and with H$_2$O on nitric acid trihydrate (NAT). The laboratory data are modeled using only two parameters for a given system: the measured reaction probability on a neat H$_2$O ice surface, and a constant from the BET theory which describes the fraction of an acid hydrate surface covered by H$_2$O as a function of relative humidity. The model indicates that ClONO$_2$ reactivity with both HCl and H$_2$O on SAT and with H$_2$O on NAT is controlled by the surface coverage of H$_2$O. In contrast, the reaction of ClONO$_2$+HCl on NAT is better described by an alternative model based on reactivity in solutions formed within a porous ice by capillary liquid absorption. (Auth. mod.)

I-55250

Gil, M., Cacho, J., Acedo, L., Sainz de Aja, M.J., **Ozone and NO$_2$ observations within the antarctic polar vortex** [Observaciones de NO$_2$ y ozono en el interior del Vertice Polar Antártico], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.135-147, In Spanish with English summary. Refs. p.139-140.

DLC G845.S93

The denitrification observed in the polar vortex core during the antarctic spring is the result, according to the most accepted theory, of the conversion of nitrogen oxides to nitric acid. However, nitrogen dioxide measurements in the core of the vortex do not show the expected NO$_2$ build-up as result of the nitric acid photodissociation, suggesting that the atmosphere remains denitrified even a few months after the evaporation of the polar stratospheric clouds (PSC) takes place. These observations, carried out together with those of ozone in Oct. 1988 at Marambio Station, confirm the hypothesis first suggested by McElroy et al. (1988) of definite removal of at least 50% nitric acid contained in the PSCs by gravitational precipitation. It is also possible that nitric acid photodissociation for this latitude and date is slow enough not to allow a significant conversion to nitrogen oxides before the vortex breakdown. (Auth. mod.)

I-55251

Cisneros, J.M., **Meteorological conditions of the antarctic ozone hole** [Condiciones meteorológicas del agujero del ozono en la Antártida], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.148-155, In Spanish with English summary. 14 refs.

DLC G845.S93

It is argued that the phenomenon of ozone depletion in the lower stratosphere during the antarctic spring is caused by special meteorological conditions over Antarctica. The meteorological conditions of the antarctic stratosphere are described, as are the possible interactions occurring between them and atmospheric pollution leading to realimentation processes. It is suggested that this could explain the intensity of the phenomenon and the biennial oscillation that it seems to present. (Auth. mod.)

I-55252

Cisneros, J.M., **High relative humidity values measured in the antarctic stratosphere** [Altos valores de humedad relativa medidos en la estratosfera antártica], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.156-158, In Spanish with English summary. 2 refs.

DLC G845.S93

Meteorological soundings carried out from the Spanish base on Livingston I. during Feb. 1989 show standard distributions of atmospheric parameters. The very high humidity values found at stratospheric altitudes suggest some explanations concerning the structure of the antarctic atmosphere. (Auth.)

I-55253

Vila Codina, J., Ramos Sainz, M., Soler Dufour, M.R., **Micrometeorological phenomena on Deception I.** [Aproximación al estudio de fenómenos micrometeorológicos en la isla Decepción], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.159-171, In Spanish with English summary. 10 refs.

DLC G845.S93

As a part of the International Program in Antarctic Volcanism, a series of meteorological observations were carried out on Deception I. Several micrometeorological phenomena due to heat transfer in the boundary layer were observed. These phenomena are presented in a quantitative form, with a special emphasis on their description. (Auth. mod.)

I-55269

Ortiz, R., Giménez, E., **Antarctic automatic instrumentation for general data acquisition** [Instrumentación antártica. Unidad automática de adquisición de datos para aplicación general], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.342-344, In Spanish with English summary. 7 refs.

DLC G845.S93

A portable data logger has been designed for permanent geophysical operations in an antarctic environment. The system is a battery-operated, microprocessor-controlled data recorder designed to receive signals from 1 to 16 transducers with signal conditioning. It is specifically designed for weather sensors such as wind speed and direction, air and soil temperatures, relative humidity, solar radiation, and pH. The software incorporates algorithms to record averages over a selected time interval. Highs and lows for the day are recorded at midnight after the algorithm is reset. (Auth.)

I-55285

Wattam, S., Turner, J., **Weather forecasting for aviation and marine operations in the Antarctic Peninsula region,** *Meteorological applications,* Dec. 1995, 2(4), p.323-332, 6 refs.

An account is given of one austral summer's experience of forecasting for flying activities and marine operations around the Antarctic Peninsula. Data available included surface and upper-air observations, analyses and forecasts from the UK Meteorological Office global 19-level model and AVHRR satellite imagery. The numerical analyses and forecasts provided good guidance and correctly represented most of the synoptic-scale features. A number of mesoscale disturbances affected the central Peninsula area and the AVHRR imagery was very valuable in allowing the development and track of these systems to be followed. The major problems were the absence of observations to the west of the Peninsula, the lack of radiosonde ascents from the Peninsula itself and the complexity of local wind systems as a result of the topography. Forecasting frontal activity over the ocean areas was also very difficult because of the unavailability of precipitation forecasts in the GRIB data. (Auth.)

I-55303

Di Donfrancesco, G., Adriani, A., Gobbi, G.P., Congeduti, F., **Lidar observations of stratospheric temperature above McMurdo Station, Antarctica,** *Journal of atmospheric and terrestrial physics,* Sep. 1996, 58(13), p.1391-1399, 21 refs.

Stratospheric temperatures were measured by lidar at McMurdo Station during two late spring months (Sep.-Oct.) in 1991 and 1992, and during the period Mar.-Oct. in 1993 and 1994. The stratosphere was found to be quite active, with one major and several minor warmings occurring in 1993 and 1994, and showing the expected behavior of a distinct region of high temperatures, formed in the polar mesosphere, descending with time and warming the stratopause region. A relative maximum of the stratopause temperature was observed in July 1994, and differences between two years in terms of the time development of average temperature in the different stratospheric layers and in terms of the average temperature variability over single months are pointed out. Monthly mean temperature profiles determined from lidar observations are compared with a reference atmosphere. Fair agreement, with discrepancies less than ±4 K, in June, July and Aug. in the middle stratosphere and just above the stratopause was found. (Auth. mod.)

I-55304

Maiss, M., et al, **Sulfur hexafluoride—a powerful new atmospheric tracer,** *Atmospheric environment,* May 1996, 30(10-11), International Global Atmospheric Chemistry Project Conference on Global Atmospheric Chemistry, 2nd, Fuji, Yoshida, Japan, Sep. 5-9, 1994, p.1621-1629, 28 refs.

Long-term observations of the atmospheric trace gas sulfur hexafluoride (SF_6) at four background monitoring stations, Neumayer, Antarctica (1986-94), Cape Grim, Tasmania (1978-94), Izaña, Canary Is. (1991-94) and Alert, Canada, (1993-94) are presented. These data sets are supplemented by two meridional profiles collected over the Atlantic Ocean (1990 and 1993) and occasional observations at the regional site of Fraserdale, Canada (1994). Compared with data from Neumayer and Izaña reported earlier, measurements are updated for all sites until the end of 1994 and the precision has improved by more than a factor of 2. With the Cape Grim archived air samples, the atmospheric SF_6 chronology is extended by 8 more years back to 1978. The long-term trend and interhemispheric gradients are due to industrial production and emission. The chemical and biological inertness of SF_6 up to stratospheric conditions results in an atmospheric lifetime of more than 800 years and makes SF_6 a powerful tool for modeling transport processes in the atmosphere. (Auth. mod.)

I-55305

Anderson, J., Saxena, V.K., **Evolution of the Mt. Pinatubo aerosol over Antarctica inferred from SAGE II extinction measurements,** *Atmospheric environment,* May 1996, 30(10-11), International Global Atmospheric Chemistry Project Conference on Global Atmospheric Chemistry, 2nd, Fuji, Yoshida, Japan, Sep. 5-9, 1994, p.1797-1804, 21 refs.

This study focuses on the evolution and stratospheric settling of the Mt. Pinatubo volcanic aerosol in the antarctic atmosphere. The volcanic aerosol characteristics are inferred from the Stratospheric Aerosol and Gas Expeiment (SAGE) II extinction measurements using a modified randomized minimization search technique between 13-30 km in the radii range between 0.10-0.80 µm. The temporal span of this study is between the date of eruption to early 1994 at latitudes poleward of 50°S. The 1991 eruption of Mt. Pinatubo resulted in the enhancement of the derived quantities with the existence of a large particle mode superimposed on the small background mode. This resulted in an order of magnitude increase in column number concentration, a 5-fold increase in column surface area, and greater than 20-fold increase in column mass loading during the austral summer of 1992. Effects of the polar vortex are observed during each austral spring since the eruption. Aerosol settling and decay in the presence of horizontal and vertical transport is observed during each austral spring. Column number concentrations have reverted to pre-eruption background levels whereas mass loading, surface area, and mean effective radius are still elevated as of early 1994. (Auth. mod.)

I-55306
Davison, B., et al, **Dimethyl sulfide and its oxidation products in the atmosphere of the Atlantic and southern oceans,** *Atmospheric environment,* May 1996, 30(10-11), International Global Atmospheric Chemistry Project Conference on Global Atmospheric Chemistry, 2nd, Fuji, Yoshida, Japan, Sep. 5-9, 1994, p.1895-1906, 47 refs.

Dimethyl sulfide, methane sulfonate, non-sea-salt sulfate and sulfur dioxide concentrations in air were obtained during a cruise between the U.K. and the Antarctic during the period Oct. 1992-Jan. 1993. In equatorial regions the atmospheric DMS concentration ranged from 3 to 46 ng (S)/m^3 with an average of 18 ng (S)/m^3. In the polar waters and regions south of the Falklands concentrations from 3 to 714 ng (S)/m^3 were observed with a mean concentration of 73 ng (S)/m^3. Methane sulfonate concentrations were also enhanced in the vicinity of the Antarctic Peninsula and in the Weddell Sea. A simple model of DMS oxidation was used to estimate the ocean to atmosphere flux rate, and this was found to be within the range of previous estimates with a mean value of 1011 ng (S)/m^2/h. (Auth.)

I-55307
Han, J.K., Jin, H.J., Xu, C.H., Kang, J.C., Wen, J.H., **Change trends of the mean annual air temperature in the last century in the South Shetland Island, Antarctica,** *Journal of glaciology and geocryology,* Sep. 1995, 17(3), p.268-273, In Chinese with English summary. 6 refs.

In this paper, the series of mean annual air temperature (MAAT) in the South Shetland Is. since 1904 were set up by correlation analysis of the data recorded at meteorological stations in the South Shetland Is. since 1944 and the Orcadas, a station with the longest continuous record in the Antarctic and subantarctic regions. Five-year moving average curves of the MAAT show that a 0.8°C warming started in the 1950s. The comparatively cold periods were in the middle of the 1910s-20s, the end of the 1920s, the end of the 1940s and the end of the 1950s; the warmer periods were the mid-1950s and 1980s. The MAAT in the 1980s was 2.2°C higher than that from 1904 to 1990. The largest amplitude in five years of the 1950s, when the temperature fluctuation was at its peak, was about 3.7°C. The authors also note 17 anomalies of the MAAT in the South Shetlands since 1904, and compare the calculated results with those measured at the Orcadas meteorologcial station.

I-55321
Radok, U., Allison, I., Wendler, G., **Atmospheric surface pressure over the interior of Antarctica,** *Antarctic science,* June 1996, 8(2), p.209-217, 17 refs.

Atmospheric surface pressures on the East Antarctic Ice Sheet are examined as a contribution to a new regional climatology based on automatic weather stations (AWS). Monthly mean pressures along two meridional AWS lines show near the coast a semi-annual oscillation with equinoctial minima, which become submerged inland under a larger annual oscillation, asymmetrically shaped around a summer solstice peak. Such a peak could arise when air surrounding the ice sheet is heated and enabled to spread out over the ice. This concept has provided a classical prediction of the ice sheet's mean elevation; in this paper the theory is expressed in a more modern form. After the summer "flood" the vertical tropospheric circulation driving the progressive katabatic surface layer, drainage from the ice sheet should create relatively higher pressures below the convergence region over the ice sheet center and lower pressures near the coast. Below the surface inversion along the sloping ice sheet surface the hydrostatic balance is shown to be governed by temperatures higher than observed at the surface. (Auth. mod.)

I-55328
Kong, Q.X., Liu, G.R., Wang, G.C., **Direct measurements of atmospheric ozone at Zhongshan Station, Antarctica,** *Antarctic research (Chinese edition),* 1996, 8(1), p.59-64, In Chinese with English summary. 6 refs.

Vertical ozone profile measurements were performed with balloon-borne electrochemical ozonesondes launched at Zhongshan Station during Apr.-Nov., 1993. An atmospheric ozone measurement system being developed jointly by IAP and CSSAR Academia Sinica consists of a balloon-borne ozonesonde, ground receiving system and data processing system. In this paper, the authors describe the performance of this system and present some of its measured results. (Auth.)

I-55330
Hara, K., Kikuchi, T., Furuya, K., Hayashi, M., Fujii, Y., **Characterization of antarctic aerosol particles using laser microbe mass spectrometry,** *Environmental science and technology,* Feb. 1996, 30(2), p.385-391, 36 refs.

Antarctic aerosol particles were collected on aluminum foil by means of a multistage high-volume air sampler from Feb. until Dec. 1991 at Showa Station. Particles on the third stage (5.4-1.6 μm) were analyzed by means of a reflection-type laser microprobe mass analyzer (LAMMA-1000) for their constituents and their seasonal variations. As a result, the seasonal behavior of methanesulfonate, nitrate, sulfates, and metallic elements including Ba, Cu, and Pb was clarified. (Auth.)

I-55331
Lugar, R.M., Harless, R.L., Dupuy, A.E., Jr., McDaniel, D.D., **Results of monitoring for polychlorinated dibenzo-p-dioxins and dibenzofurans in ambient air at McMurdo Station, Antarctica,** *Environmental science and technology,* Feb. 1996, 30(2), p.555-561, 18 refs.

This paper presents the results of ambient air monitoring for polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) performed during the 1992-1993 and 1993-1994 summers in the vicinity of McMurdo Station. The most frequent, most varied, and highest levels of PCDDs/PCDFs were measured at a "downtown" location, where concentrations of total PCDDs ranged from 0.12 to 1.80 pg/m^3 and total PCDFs ranged from less than 0.02 to 2.77 pg/m^3. The data indicate that there are combustion sources at McMurdo other than the solid waste incinerator (power plants, vehicles, heating furnaces, etc.) that contribute PCDD/PCDF compounds to the ambient air. The greatest variety and highest concentration of PCDD/PCDF congeners measured in 1992-1993 during incineration of selected solid wastes implicates the interim incinerator as the likely source of the increased presence of these compounds in the air. (Auth. mod.)

I-55350
Glaccum, W., et al, **Polar Ozone and Aerosol Measurement instrument,** *Journal of geophysical research,* June 20, 1996, 101(D9), p.14,479-14,487, 11 refs.

The second Polar Ozone and Aerosol Measurement instrument (POAM II) is a spaceborne experiment designed to measure the vertical profiles of ozone, water vapor, nitrogen dioxide, aerosol extinction and temperature in the polar stratosphere and upper troposphere with a vertical resolution of about 1 km. Measurements are made by the solar occultation technique. The instrument package, which has a mass of less than 25 kg, is carried on the Satellite Pour l'Observation de la Terre (SPOT) 3 spacecraft and has a design lifetime of 3 to 5 years. POAM II has provided data on the south polar ozone hole, north and south polar ozone phenomena, the spatial and temporal variability of stratospheric aerosols and polar stratospheric clouds, and has detected polar mesospheric clouds. (Auth.)

I-55351
MacKenzie, I.A., Harwood, R.S., Froidevaux, L., Read, W.G., Waters, J.W., **Chemical loss of polar vortex ozone inferred from UARS MLS measurements of ClO during the arctic and antarctic late winters of 1993,** *Journal of geophysical research,* June 20, 1996, 101(D9), p.14,505-14,518, 47 refs.

A computationally cheap and easily initialized photochemical model using Upper Atmospheric Research Satellite Microwave Limb Sounder measurements of ClO to calculate ozone destruction rates within the polar vortices due to the ClO + ClO, ClO + BrO, and ClO + O catalytic cycles is developed. The method involves calculating local reactive chlorine concentrations from individual ClO retrievals, and then inferring the diurnal cycle of ClO from a quadratic expression using the relevant kinetic parameters. In test integrations this simple treatment is shown to give good agreement with more detailed model calculations. Analysis of the late arctic and antarctic winters of 1993 yields similar vortex-averaged ozone loss rates at 465 K of ca. 1% per day in both hemispheres, while the reactive chlorine remains enhanced. Net ozone destruction in the north is less, largely because the elevated ClO and Cl_2O_2 concentrations are less persistent. The estimated chemical destruction on isentropic surfaces in the lower stratosphere is broadly similar to the observed change in ozone distribution, implying that the change is dominated by chemical destruction. (Auth. mod.)

I-55355

Whetton, P., Pittock, A.B., Labraga, J.C., Mullan, A.B., Joubert, A., **Southern Hemisphere climate: comparing models with reality,** Climate change: developing Southern Hemisphere perspectives. Edited by T.W. Giambelluca and A. Henderson-Sellers, Chichester, UK, John Wiley & Sons, 1996, p.89-130, Refs. p.126-130.

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The authors examine how well climate models reproduce some of the key features of the Southern Hemisphere climate, focusing firstly on the hemispheric or zonal average performance of the models, before zooming in on some regional analyses. They then discuss briefly how some of the major gaps in the present ability of GCMs to simulate key features might be filled, and look at some policy implications. First, however, they establish what observational data are available to provide a description of the present climate, since this provides the 'truth' against which the simulated climate of the models must be judged.

I-55365

Scientific Committee on Antarctic Research, **SCAR report No.11, Feb. 1996,** Cambridge, UK, Scott Polar Research Institute, 1996, 43p.

This bulletin consists of 3 parts and 9 appendices. Part A presents the Executive Summary of GLOCHANT Activities from 1990 to 1995, outlining six thematic areas comprised in the SCAR science plan. Part B presents a report of the third meeting of the Group of Specialists (GLOCHANT III), held in Tokyo at the National Institute of Polar Research, Apr. 17-19 and Apr. 21, 1995. Part C presents a report of the joint meeting of GLOCHANT Planning Groups 1 and 5 and GoSSOE/CS-EASIZ, held in Tokyo at the National Institute of Polar Research, Apr. 19-21, 1995. The appendices include names and affiliations of members of the GLOCHANT Group of Specialists, the SCAR/GLOCHANT financial statements for 1994, and reports from Planning Groups 1 and 5, on the antarctic sea ice zone and biochemical cycles, respectively.

I-55379

Keller, L.M., Weidner, G.A., Stearns, C.R., Whittaker, M.T., Holmes, R.E., **Antarctic automatic weather station data for the calendar year 1994,** Madison, University of Wisconsin, 1996, 34p.

A network of automatic weather station (AWS) units has been deployed to collect antarctic surface weather observations in support of specific meteorological research projects as well as operational activities at McMurdo Station. The 1994 network consisted of 45 installed AWS units providing observations on the Ross Ice Shelf, east of the Transantarctic Mountains and north of McMurdo to the Adélie Coast, along the Antarctic Peninsula and climatological locations such as the South Pole. Each unit measures air temperature, wind speed, and wind direction at a nominal height of 3 m, and air pressure at the electronics enclosure. Some AWS units also measure the relative humidity at 3 m and vertical air temperature difference between 0.5 and 3 m. Measurement heights relative to the actual surface at the site are nominal due to snow accumulation around the AWS unit.

I-55414

Yamanouchi, T., Charlock, T.P., **Comparison of radiation budget at the TOA and surface in the Antarctic from ERBE and ground surface measurements,** *Journal of climate,* Dec. 1995, 8(12), p.3109-3120, 24 refs.

Fluxes at Showa and Amundsen-Scott stations were plotted against cloud amounts derived from surface synoptic observations. Throughout the year over the snow- and ice-covered Antarctic, cloud radiation heated the surface and cooled the atmosphere; cloud longwave (LW) effects were greater than cloud shortwave (SW) effects. Clouds have a negligible effect on the absorption of SW by the atmosphere in the interior, and clouds slightly increase the absorption of SW by the atmosphere along the coast. At the top of the atmosphere (TOA), the LW cloud effect was heating along the coast in summer and winter, heating in the interior during summer, and slight cooling in the interior during winter. This unique TOA cloud LW cooling was due to the extremely low surface temperature in the interior during winter. At the TOA, clouds induced SW cooling in the interior and along the coast; sorting of pixel-scale ERBE data and surface cloud observations was required to demonstrate this. (Auth. mod.)

I-55422

Bian, L.G., Lu, L.H., Jia, P.Q., Zheng, X.D., Wang, Y., **Radiation and ozone data at Zhongshan Station, Antarctica 1993-1994; radiation data at Great Wall Station, Antarctica 1993-1994,** *CHINARE data report,* Dec. 1995, No.9, 270p.

This volume gives diurnal, annual and hourly mean values of global, reflected, net and ultraviolet radiation from Feb. 11, 1993 to Dec. 31, 1994 at Zhongshan Station, and of global, reflected and net radiation from May 17, 1993 to Dec. 31, 1994 at Great Wall Station. Other computational elements such as the surface albedo and effective radiation on the surface are also given.

I-55425

Pettré, P., Périard, C., **Climate at Dumont d'Urville and in Antarctica** [Aspects du climat de Dumont-d'Urville et de l'Antarctique], *La météorologie,* Mar. 1996, 8(13), p.55-62, In French with English summary. 11 refs.

Study of the thirty-year series of meteorological data from Dumont d'Urville Station has shown a warming trend in the annual average temperature of 0.26°C per decade. The climate of Dumont d'Urville is characterized by a long winter from May to Oct. and short summer from Nov. to Jan. The inter-seasons are very short, but the autumn is longer than the spring due to the influence of the ocean, which slows the cooling process. The annual cycle of the monthly average pressure is determined by the southern semi-annual oscillation. Katabatic winds, which are the main climate phenomenon of the region, blow the most frequently and strongly during the inter-seasons under the influence of the general circulation. (Auth.)

I-55426

Berger, A., **Ozone hole and the 1995 Nobel Prize in chemistry** [Trou d'ozone et prix Nobel 1995 de chimie], *La météorologie,* Mar. 1996, 8(13), p.63-73, In French with English summary. 21 refs.

To mark the award of the 1995 Nobel Prize in chemistry to three world renowned atmospheric chemists, this paper recalls the history of scientific progress in stratospheric ozone chemistry. It then summarizes current knowledge of ozone-layer depletion and its impact on climate, vegetation and human health. Sample data from antarctic stations are included. (Auth. mod.)

I-55428

Colwell, S., Turner, J., **First FROST trial period - a summary of reports received over the GTS between 5-9 July 1993,** Scientific Committee on Antarctic Research. First Regional Observing Study of the Troposphere. FROST report No.1, Cambridge, UK, British Antarctic Survey, 1993, 14p.

FROST is an international project being organized by SCAR to study the meteorology of the Antarctic and validate the numerical analyses and forecasts over the high southern latitudes. It is based upon three one-month Special Oserving Periods (SOP) arranged for July 1994, Oct. 16 to Nov. 15, 1994 and Jan. 1995 during which comprehensive data sets will be created of observations from the Antarctic and high quality analyses prepared. These analyses will be used in an intercomparison of operational numerical analyses and for studies of antarctic tropospheric processes.

This preliminary report summarizes the reports that were received between the 5th and 9th of July 1993. An Appendix lists the stations in the Antarctic and describes their mode of operation.

I-55429

Turner, J., **Implementation plan version 4.0 dated 16 December 1993. Revised following the second meeting of the FROST Organising Committee, November 1993,** Scientific Committee on Antarctic Research. First Regional Observing Study of the Troposphere. FROST report No.2, Cambridge, UK, British Antarctic Survey, 1993, 22p.

This document describes an international program (FROST) to study the meteorology of the Antarctic and validate numerical analyses and forecasts in the area. The analyses and forecasts produced for the Antarctic are poor compared to other parts of the world despite increasing amounts of data that have become available over recent years. Central to the validation effort will be the production of a series of high-quality synoptic and subsynoptic-scale analyses of the antarctic region covering three Special Observing Periods (SOPs) in the austral winter, spring and summer (July 1994, Oct. 16 to Nov. 15, 1994 and Jan. 1995).

I-55437

Banham, S.F., Horn, A.B., Koch, T.G., Sodeau, J.R., **Ionisation and solvation of stratospherically relevant molecules on ice films,** *Chemical Society, London. Faraday discussions,* 1995, Vol.100, p.321-332, 26 refs.

Heterogeneous reactions of stratospheric reservoir species such as HCl, N_2O_5 and $ClONO_2$ on type I (nitric acid hydrates) and type II (water-ice) polar stratospheric cloud (PSC) particles are believed to play an important role in the large losses of stratospheric ozone observed during the antarctic spring. Laboratory studies of such processes, using thin ice films as PSC particle surface mimics, can provide mechanistic information about individual elementary steps and overall reaction schemes. IR and mass spectrometry have been used to identify reaction products and intermediates and it has been shown that the primary step in all the studied reaction schemes involves the formation of ionic surface species. Furthermore, the nature and stability of the ions are found to be inextricably linked with the amount of 'free' water available to solvate them. The following questions are also addressed: are adsorbed ions (e.g. nitrate, chloride and oxonium) reactive on ice surfaces? If so, are the products formed the same as those suggested when their corresponding molecular parents are involved? (Auth. mod.)

I-55439

Toon, O.B., Turco, R.P., Hamill, P., **Denitrification mechanisms in the polar stratospheres,** *Geophysical research letters,* Mar. 1990, 17(4)suppl., p.445-448, 19 refs.

Microphysical simulations suggest that the time required for nitric acid particles to sediment from the stratosphere is comparable to the time required for falling ice particles to incorporate nitric acid vapor from the vapor phase. Since nitric acid particles form earlier in the winter than ice particles, these simulations favor denitrification being a separate process from dehydration, with denitrification being due to nitric acid particles and dehydration due to ice particles. In the authors' simulations, the column abundance of nitric acid is only depleted if temperatures low enough for nitric acid particles to exist extend to the altitude above which the column is measured. Such low temperatures are infrequent in the arctic lower stratosphere, which may be the main reason that the arctic stratospheric column shows little loss of nitric acid during winter, while the colder antarctic stratospheric column shows a substantial loss of nitric acid. (Auth. mod.)

I-55440

Loewenstein, M., Podolske, J.R., Strahan, S.E., **ATLAS instrument characterization: accuracy of the AASE and AAOE nitrous oxide data sets,** *Geophysical research letters,* Mar. 1990, 17(4)suppl., p.481-484, 10 refs.

ATLAS, the Airborne Tunable Laser Absorption Spectrometer, was used to measure nitrous oxide in the 1987 Airborne Antarctic Ozone Experiment (AAOE) and in the 1989 Airborne Arctic Stratospheric Expedition (AASE). After the AASE, a detailed study of the ATLAS characteristics was undertaken to quantify the error inherent in the *in-situ* measurement of atmospheric N_2O. Using the latest calibration of the ATLAS (June 1989) and incorporating the recognized errors arising in the flight environment of ATLAS, the authors established that for both the AASE and the AAOE most of the acquired N_2O data sets are accurate to ±10% (2 sigma). Data from two of the earlier AAOE flights had a larger uncertainty. (Auth. mod.)

I-55441

Kawa, S.R., Fahey, D.W., Anderson, L.C., Loewenstein, M., Chan, K.R., **Measurements of total reactive nitrogen during the Airborne Arctic Stratospheric Expedition,** *Geophysical research letters,* Mar. 1990, 17(4)suppl., p.485-488, 13 refs.

Composite distributions of measured total reactive nitrogen (NO_y) from the NASA ER-2 during the Airborne Arctic Stratospheric Expedition (AASE) are presented. The observed features of these distributions are discussed in terms of the controlling dynamical, chemical, and microphysical processes. The features of the distribution are apparently dynamically controlled. Poleward of 5° of latitude within the boundary, the average NO_y decreases sharply and is significantly lower than that predicted from N_2O. This feature is consistent with loss of NO_y through sedimentation of particles containing NO_y in polar stratospheric clouds. The observed loss is not as systematic as in the Antarctic, consistent with the observed differences in season and meteorological conditions between the two campaigns. (Auth. mod.)

I-55472

Robertson, S.H., Clary, D.C., **Solvation of hydrogen halides on the surface of ice,** *Chemical Society, London. Faraday discussions,* 1995, Vol.100, p.309-320, 36 refs.

Heterogeneous processes on the surface of ice crystals in polar stratospheric clouds are thought to play a crucial role in the catalysis of reactions such as $HCl+ClONO_2$. An important consideration here is the mechanism of solvation of the HCl molecules on the ice surface. A molecular dynamics simulation of the solvation of HCl, HF and HBr by an ice surface at 190 K is reported. The model allows for the solvation of the hydrogen halide by water molecules on the ice surface to form solvated ions. The simulations suggest that the ionic solvation process is energetically feasible for HCl and HBr, but not for HF. (Auth.)

I-55480

Wexler, H., Rubin, M.J., **Antarctic climatology and meteorology,** Antarctica in the International Geophysical Year. Geophysical monograph no.1, Washington, D.C., [American Geophysical Union], 1956, p.36-43, 18 refs.

The antarctic affords an opportunity to investigate a wide range of meteorological problems under conditions not found elsewhere on Earth. These problems include the examination of the thermal, mass, and mobile structure of an atmosphere cut off both from direct solar energy for many months and from conduction of appreciable heat from below. The sharp distinction between the troposphere and the stratosphere, so marked elsewhere, is believed to vanish during the polar night over Antarctica. Another problem is whether the antarctic troposphere's flow pattern is dominated by the mid-latitude planetary wave system moving radially outward from the interior of the Continent, as suggested by earlier meteorological observations. A smaller-scale, but important problem, especially for field and aircraft parties, is the drainage, blocking, and deflective influence of mountains and hills on producing local circulations and blizzardy winds up to hurricane force. The existence of a uniformly thermal and flat snow surface, such as is found for hundreds of miles over the Ross Ice Shelf, will provide an unexcelled natural laboratory to study atmospheric turbulence and energy exchange between atmosphere and snow surface. (Auth. mod.)

I-55509

CNR Direzione Centrale Attivitá Scientifiche, **Airborne Polar Experiment,** *Ambiente Antartide,* Apr. 30, 1994, Special issue, p.1-35, Refs. p.34.

This special issue of Ambiente Antartide describes the Airborne Polar Experiment, an international program on polar atmosphere: its objectives, mainly to study ozone production and loss mechanism in polar regions; the scientific and technical aspects, including instruments used and logistics and operations; its functional organization and supporting institutions; and cost analysis. It also presents an introductory statement to the 2nd Workshop on Airborne Polar Experiment, held in Rome, Nov. 22-24, 1993.

I-55519

Ma, C.G., Li, M., Zhang, Y.P., Li, H.Z., Zhu, P.R., Liu, J.R., **On the study of aerosol composition at the Great Wall Station, South Pole,** *Journal of environmental sciences (China),* 1989, 1(1), p.47-54, 10 refs.

DLC TD187.5.C6J68 1989-90

On the premise that the South Pole region offers one of the best locations on Earth for studying the composition of background aerosols, samples were collected at the Great Wall Station, in particle size fractions by 8 stage cascade impactors, from Jan. to Dec. 1986. The samples were analyzed by the Proton Induced X-ray Emission (PIXE) method. To determine the enrichment factors of various elements, all results were separated into 2 groups of coarse and fine particles; the correlation coefficients of elements of both groups are discussed. The aerosol levels measured at Great Wall Station, when compared to those recently measured at Amundsen-Scott Station, led to the conclusion that the latter contains the least atmospheric pollution of the region.

I-55574

Laj, P., Ghermandi, G., Cecchi, R., Ceccato, D., **Coupling PIXE and SEM/EDAX for characterizing atmospheric aerosols in ice-cores,** *Nuclear instruments and methods in physics research B,* Apr. 1996, Vol.109-110, International Conference on PIXE and its Analytical Applications, 7th, Padua, Italy, May 26-30, 1995. Proceedings, p.252-257, 22 refs.

Understanding temporal and spatial fluctuations related to changing environmental conditions is a key step in assessing future climatic change. The atmosphere's chemical constituents are deposited onto polar ice sheets, and conserved by accumulation of snow layers. Drillings in Greenland and Antarctica have provided long-term records of atmospheric constituents spanning the last 150,000 years. Within the framework of the Greenland Ice Core Project (GRIP), the authors have developed a methodology coupling PIXE to SEM-EDAX analysis for the characterization of the aerosols deposited in polar precipitation. This paper presents initial results on soluble/insoluble speciation for both antarctic and Greenland samples. The study provides new information in the interpretation of ice core paleo-environmental records. (Auth. mod.)

I-55582

Radionov, V.F., Marshunova, M.S., Rusina, E.N., Lubo-Lesnichenko, K.E., Pimanova, IU.E., **Atmospheric aerosol turbidity over polar regions,** *Izvestiya. Atmospheric and oceanic physics,* June 1995, 30(6), p.762-766, Translated from Izvestiia. Fizika atmosfery i okeana. 11 refs.

The authors consider aerosol-optical characteristics of the atmosphere on the basis of observations carried out at various arctic stations (Tikhaya Bay, Dikson I., Severnaya Zemlya, Kotel'nyy I.) and at Mirnyy Observatory in the Antarctic. The observational data show that the level of aerosol pollution in the Antarctic is usually very low, while in the Arctic the spring level of pollution is comparable with that in the middle latitudes. (Auth. mod.)

I-55584

Elanskiĭ, N.F., Markova, T.A., **Surface atmosphere layer ozone concentration over the Atlantic Ocean and the Weddell Sea,** *Izvestiya. Atmospheric and oceanic physics,* June 1995, 31(1), p.85-96, Translated from Izvestiia. Fizika atmosfery i okeana. 27 refs.

The results of ozone concentration measurements in an atmospheric surface layer carried out from on board the research vessel *Akademik Fedorov* during Aug.-Nov. 1989 are presented. The characteristics of ozone distribution in the mid-latitudes and tropics of the Atlantic Ocean are analyzed. Low values of the ozone concentration were observed over the Weddell Sea inside the polar vortex. Day-to-day ozone variations are connected here with a migration of the vortex boundary, the passage of synoptic-scale eddies, and air advection from the mid-latitudes and Antarctica. No sharp drops are observed in the ozone concentration in the spring period, as are usually observed in the north polar region and connected with the action of bromorganic compounds. (Auth. mod.)

I-55585

Edouard, S., Legras, B., Zeitlin, V., **Effect of dynamical mixing in a simple model of the ozone hole,** *Journal of geophysical research,* July 20, 1996, 101(D11), p.16,771-16,778, 28 refs.

The role of the horizontal dynamical mixing on the ozone destruction by chlorine in the antarctic polar stratosphere is investigated, using a one-dimensional high-resolution model to represent the microstructure of chemical species distribution on which the effective reactivity depends. The chemical model is idealized by only considering two species, ozone and chlorine. Ozone destruction is proportional to the square of chlorine content. The authors compare the effects of a chaotic type of mixing, represented as a Bernoulli map over the unit interval, with purely diffusive mixing, which is used in most parameterizations of turbulence. Owing to the nonlinearity of the chemical reaction, reactivity decreases with mixing if the chemical constant is small, while it increases with mixing for large values of the chemical constant. In any situation, large discrepancies in the ozone destruction are observed between chaotic and diffusive mixing, indicating the need for a better representation of the mixing processes in studies of stratospheric chemistry. (Auth. mod.)

I-55604

Wendler, G., Pook, M., **On the relationship between extra-terrestrial radiation and surface pressure,** *Antarctic science,* Sep. 1996, 8(3), p.303-305, 7 refs.

The surface pressure of an antarctic station displays two minima, one in spring, the other in autumn. It is believed that these minima are caused by radiative forcing, as the gradient of the extraterrestrial radiation is largest during the two equinoxes. The best correlation (r=0.85) was obtained when the pressure lagged the radiation gradient by ten days. (Auth.)

I-55619

Fraser, G.J., **Monthly mean winds in the mesosphere at 44S and 78S,** *Pure and applied geophysics,* 1989, 130(2/3), p.291-301, 18 refs.

DLC QC801.G37

A medium frequency partial-reflection spaced-antenna wind radar was installed at Scott Base on Ross I. in Nov. 1982. Results from this radar for the period Dec. 1982 to Oct. 1984 inclusive are compared with simultaneous measurements made with a similar radar at Christchurch, NZ. Monthly mean zonal winds measured at 80 km are compared with recent models for the Southern Hemisphere middle atmosphere. There is a general agreement with the models but there is evidence that the Christchurch winter flow was atypical in 1983. (Auth.)

I-55620

Nichol, S.E., Clarkson, T.S., **1989 ozone hole,** *Weather and climate,* 1991, Vol.11, p.80-82, 5 refs.

The status of the ozone hole over Antarctica for 1989 is graph-plotted along with the measurements for 1987 and 1988. The three plots are discussed, compared and contrasted. It was thought that the ozone loss was on a two-year cycle and that 1989 would show a lesser loss but the plot was nearly identical to the one for 1987. These readings generally are seen to represent conditions in the McMurdo Sound area, with the readings being made by equipment at Arrival Heights.

I-55641

Zhang, R.Y., Leu, M.T., Molina, M.J., **Formation of polar stratospheric clouds on preactivated background aerosols,** *Geophysical research letters,* June 15, 1996, 23(13), p.1669-1672, 26 refs.

Results of laboratory simulations of the growth of nitric acid trihydrate, $HNO_3 \cdot 3H_2O$, on sulfuric acid tetrahydrate, $H_2SO_4 \cdot H_2O$, are presented. The observations reveal that under typical stratospheric conditions, uptake of HNO_3 on a $H_2SO_4 \cdot 4H_2O$ substrate results in a surface coverage of approximately one monolayer or less, and that initial nucleation requires a large supersaturation. In the stratosphere, polar stratospheric cloud particles may experience repeated cycles of evaporation and condensation of HNO_3 on preexisting background frozen sulfate aerosols. Hence, growth of $HNO_3 \cdot 3H_2O$ on preactivated aerosols provides one important mechanism for polar stratospheric cloud formation and denitrification. (Auth. mod.)

I-55642

Biermann, U.M., Presper, T., Koop, T., Mößinger, J., Crutzen, P.J., Peter, T., **Unsuitability of meteoritic and other nuclei for polar stratospheric cloud freezing,** *Geophysical research letters,* June 15, 1996, 23(13), p.1693-1696, 26 refs.

Bulk freezing experiments have been performed with binary and ternary $HNO_3/H_2SO_4/H_2O$ solutions containing original micrometeorites, ground samples of representative larger meteorites and other freezing nuclei of potential stratsopheric importance. The experiments help to determine upper bounds for the heterogeneous freezing rates of sulfuric and nitric acid hydrates. Based on an analysis of the meteoritic mass flux from space and of the modifications meteorites undergo when entering the atmosphere, the resulting morphology and surface area of extraterrestrial material in the stratosphere are estimated. Micrometeorites gained from Antarctica are thus shown to be a good proxy for meteoritic surfaces in the stratosphere. In combination with this analysis the freezing experiments suggest that heterogeneous nucleation rates on micrometeorites are too low to enhance freezing of polar stratospheric clouds above the frost point. (Auth. mod.)

I-55656

Dye, J.E., et al, **In-situ observations of an antarctic polar stratospheric cloud: similarities with arctic observations,** *Geophysical research letters,* July 15, 1996, 23(15), p.1913-1916, 15 refs.

Measured particle volumes in a type I polar stratospheric cloud near the antarctic polar vortex show that the onset of the cloud occurred near 193 K, or 3° colder than nitric acid trihydrate saturation. The onset temperature, the smooth increase of volume with decreasing temperature, the inverse correlation of particle volume and enhanced NO_y (HNO_3 in the particles) with temperature, and comparisons of observations with an equilibrium model of ternary droplet growth, all support the notion that much of this type I PSC was ternary solution droplets. This provides confirmation of previous findings in the Northern Hemisphere. However, the ternary model does not fit the observations in all regions. This may be due to the presence of some solid phase growth in agreement with impactor observations. (Auth. mod.)

I-55659

Andreas, E.L., Cash, B.A., **New formulation for the Bowen ratio over saturated surfaces,** *Journal of applied meteorology,* Aug. 1996, 35(8), p.1279-1289, 34 refs.

Analytical expressions are presented for calculating the Bowen ratio, $Bo=H_s/H_L$, from a quantity that is derived primarily from the surface temperature T_s and the assumption that the near-surface air is saturated (but not supersaturated) with water vapor. Here H_s is the surface sensible heat flux and H_L is the surface latent heat flux. These analytical expressions taken from the literature came from experiments over snow-covered and sea ice and over water in the Great Lakes, the marginal seas, and the open ocean at a variety of latitudes including Antarctica. This analysis suggests that the analytical expressions should generally predict Bo to better than ±40%. It is concluded that predicting Bo from surface temperature alone yields good results for large-scale or longer time (e.g., daily) averages but is less accurate when both the spatial and temporal averaging are limited. Consequently, the results will probably find most use in global climate models, in coupled ice-ocean-atmosphere models, and for data assimilation and quality control. (Auth. mod.)

I-55677

Barron, J.A., **Diatom constraints on the position of the Antarctic Polar Front in the middle part of the Pliocene,** *Marine micropaleontology,* Apr. 1996, 27(1-4), p.195-213, Refs. p.211-213.

The relative percentages of diatom taxa in 5 deep-sea cores from the southern ocean are determined for an interval centered on 3.1 to 2.9 Ma in the middle Pliocene. This climatically warm interval, which is being studied by the PRISM Project of the U.S. Geological Survey, coincides with a proposed interval of major deglaciation of East Antarctica. The maximum southerly position of the Antarctic Polar Front between 3.1 and 3.0 Ma is inferred from these diatom studies, the presence of calcareous nannofossils in the sediments, and sedimentologic and micropaleontologic information from the literature. It is suggested that the Antarctic Polar Front may have migrated by as much as 6° of latitude further to the south in the southeastern Atlantic and Indian Oceans during this Pliocene warm interval but probably lay close to its present day position in the southwest Atlantic and Drake Passage. Summer sea surface temperatures are inferred to have been no more than 3-4°C warmer than present at latitudes between 55° and 60°S. (Auth. mod.)

I-55678

Burckle, L.H., Mortlock, R., Rudolph, S., **No evidence for extreme, long term warming in early Pliocene sediments of the Southern Ocean,** *Marine micropaleontology,* Apr. 1996, 27(1-4), p.215-226, 56 refs.

During the past 10 years there has been considerable debate with respect to the response of the antarctic ice sheets to early Pliocene warmth. Here, this question is approached by using biogenic opal and carbonate in deep-sea sediments as proxy for paleoceanographic change. During the present day, these measures are largely dictated by the position of the Antarctic Polar Front (APF), with biogenic carbonate exhibiting an increase north of the APF and biogenic opal increasing to the south. That the carbonate/opal transition zone is a reliable feature in deep-sea sediments is evidenced by the fact that it is recorded north of its present position during the Last Glacial Maximum (LGM) and to the south of it during oxygen isotope stage 11, a warmer than present interglacial. When these proxies are applied to southern ocean sediments, high frequency glacial/interglacial changes are seen in the Pliocene and early Pleistocene. What appears to be a major glacial is recorded at about 4.5 Myr B.P. Such data do not support any appreciable warming of surface waters near the antarctic continent; neither do they support any claims of high (ca. 20°) sea-level air temperatures over the East Antarctic Ice Sheet (EAIS). It is concluded that there is no evidence for significant drawdown of EAIS during early Pliocene warmth. (Auth. mod.)

I-55683

Charles, C.D., Lynch-Stieglitz, J., Ninnemann, U.S., Fairbanks, R.G., **Climate connections between the hemisphere revealed by deep sea sediment core/ice core correlations,** *Earth and planetary science letters,* July 1996, 142(1-2), p.19-27, 33 refs.

Correlation of southern ocean deep sea sediment core records with ice core records of polar climate delineates with unprecedented detail the relationship between high latitude climate and the ocean's thermohaline circulation over the last 80,000 years. These observations suggest that, while North Atlantic Deep Water variability manifests itself clearly in southern ocean nutrient proxy records over periods as short as 500 yr, this deep water variability did not promote a direct link between climate variability in the high latitudes of the two hemispheres on millennial timescales. In particular, the proxy records indicate that, on average, Northern Hemisphere climate fluctuations lagged those of the Southern Hemisphere by 1500 yr. (Auth. mod.)

I-55685

De Rudder, A., Larsen, N., Tie, X.X., Brasseur, G.P., Granier, C., **Model study of polar stratospheric clouds and their effect on stratospheric ozone. 1. Model description,** *Journal of geophysical research,* May 20, 1996, 101(D7), p.12,567-12,574, 37 refs.

The authors have included detailed microphysical processes accounting for the formation of polar stratospheric clouds (PSC) into a global chemical/dynamical two-dimensional model to study the effect of heterogeneous reactions occurring on the surface of PSCs on stratospheric ozone. The model explicitly calculates the formation of the PSC particles in terms of heterogeneous nucleation, condensation, and sedimentation. The transport of the particles and heterogeneous reactions on the particles are also represented in the model. The calculated PSC particles show that the distributions of PSCs in the Arctic and in Antarctica are very different. Over Antarctica, nitric acid trihydrate particles (type I PSCs) are formed from early June to late Sep., while in the Arctic, type I PSCs are formed only in Jan. Ice crystal clouds (type II PSCs) are present over Antarctica in Aug., but are not seen in the Arctic. (Auth. mod.)

I-55686

Tie, X.X., Brasseur, G.P., Granier, C., De Rudder, A., Larsen, N., **Model study of polar stratospheric clouds and their effect on stratospheric ozone. 2. Model results,** *Journal of geophysical research,* May 20, 1996, 101(D7), p.12,575-12,584, 37 refs.

The authors use the detailed microphysical/chemical/dynamical two-dimensional model described in part I [De Rudder et al., this issue] to study the effect of heterogeneous reactions occurring on the surface of polar stratospheric clouds (PSCs) on stratospheric ozone. The calculations show that these heterogeneous reactions are the likely causes of the ozone decrease observed from 1980 to 1990 in both Antarctica and the Arctic. The calculation shows that the dense sulfate aerosol cloud produced by the eruption of Mount Pinatubo in 1991 has enhanced the formation rate of type I PSCs in the Arctic and the Antarctic. The effect on the ozone depletion in the Antarctic is, however, limited due to fact that the conversion from $ClONO_2$ to ClO on PSCs is almost "saturated" under non-volcanic conditions. For potential ozone depletion, the enlargement in the area covered by PSCs may therefore be more important than the increase in PSC density. The calculation also shows that, in the future, the density of PSCs in the Arctic could be enhanced owing to the potential emission of water vapor and nitrogen species by high altitude aircraft. (Auth. mod.)

I-55690

Gabric, A.J., Ayers, G., Murray, C.N., Parslow, J., **Use of remote sensing and mathematical modelling to predict the flux of dimethylsulfide to the atmosphere in the southern ocean,** *Advances in space research,* 1996, 18(7), Satellite data for atmosphere, continent and ocean research: Proceedings of the A3 and A4 Meetings of COSPAR Scientific Commission A held during the 30th COSPAR Scientific Assembly, Hamburg, Germany, 11-21 July 1994. Edited by E. Raschke, V. V. Solomonson, R. Stühlmann, and F. Wilkerson, p.(7)117-(7)128, 29 refs.

An existing ecological model of DMS production has been extended and applied to the spring-summer period in the subantarctic southern ocean. The model predicts that production of phytoplankton and dissolved DMS will increase during spring to reach a maximum in summer consistent with the atmospheric data collected at the Cape Grim baseline station. Archival Coastal Zone Color Scanner satellite imagery has been used to define the seasonal range in phytoplankton concentration in the study region and to validate model predictions. Local measured wind and sea temperature data have been used to calculate the DMS transfer velocity which is used to compute the sea-to-air flux of DMS. The seasonal trend in predicted DMS flux is in good agreement with the flux estimates made from observations. (Auth.)

I-55693

Harvey, M.W., Fraser, G.J., **Dynamical influences on the antarctic ozone hole,** *Weather,* Aug. 1996, 51(8), p.266-273, 5 refs.

In a recent undergraduate research project, a zonal harmonic analysis was performed on data from the Total Ozone Mapping Spectrometer (TOMS) instrument on board the Nimbus-7 satellite. The method has the potential to yield valuable insights into antarctic polar vortex-planetary wave interactions and the relationship between such interactions and photochemical ozone depletion. In addition, the nominal cost and easy accessibility of the data, together with the relative simplicity of the data processing involved, make the method described here a useful educational tool in both undergraduate and advanced secondary level meteorology courses. (Auth. mod.)

I-55696

Lanzendorf, E.J., Kummel, A.C., **Photodissociation of condensed films of chlorine dioxide,** *Geophysical research letters,* June 1, 1996, 23(12), p.1521-1524, 26 refs.

The photochemistry of condensed films of OClO was examined with photofragment spectroscopy. Photolysis of multilayers of OClO on a polycrystalline Pt surface with 355 nm light yields predominantly atomic O, O_2, atomic Cl, and ClO photofragments. The authors measured the quantum yield for the Cl product channel to be 0.8, which is some 800 times higher than reported values for the non-resonant gas-phase photolysis of OClO. This result may have implications for stratospheric ozone chemistry. (Auth. mod.)

I-55697

Kreher, K., Keys, J.G., Johnston, P.V., Platt, U., Liu, X., **Ground-based measurements of OClO and HCl in austral spring 1993 at Arrival Heights, Antarctica,** *Geophysical research letters,* June 1, 1996, 23(12), p.1545-1548, 19 refs.

Ground-based measurements of stratospheric OClO and HCl total columns are reported. The data were obtained during the spring season of 1993 at Arrival Heights using zenith sky and direct sun absorption spectroscopy in the visible and infrared spectral regions. Together these data sets represent complementary measurements of chlorine species in Antarctica over an extended period in spring. To illustrate aspects of antarctic stratospheric chemistry and dynamics that are significant in current studies of ozone depletion, the OClO and HCl data are supplemented by simultaneously measured NO_2 data as well as ancillary data from other sources. Comparison of the data with total ozone and stratospheric temperature records shows that the springtime chlorine variations are in agreement with currently accepted models of antarctic ozone depletion chemistry. (Auth. mod.)

I-55698

Koch, T.G., Holmes, N.S., Roddis, T.B., Sodeau, J.R., **Low-temperature photochemistry of submicrometer nitric acid and ammonium nitrate layers,** *Journal of physical chemistry,* July 4, 1996, 100(27), p.11402-11407, 34 refs.

Reflection-absorption infrared spectroscopy has been employed in order to investigate the low-temperature photochemistry (90-140 K) of thin films of nitric acid and ammonium nitrate grown *in vacuo.* Photolysis of amorphous nitric acid hydrate, the crystalline dihydrate and trihydrate at $\lambda > 230$ nm resulted in the formation of molecular nitric acid due to rapid protonation of the excited nitrate ion. Secondary photolysis of $HONO_2$ produced NO_2 and NO. If a neat film of molecular, anhydrous nitric acid was irradiated, nitrate and nitronium ions were observed. In contrast, ammonium nitrate photolysis at 140 K did not result in a proton transfer to produce NH_3 and $HONO_2$ but in the formation of the peroxynitrite ion ($ONOO^-$) as a precursor for NO_2^-. Molecular dinitrogen tetraoxide and nitrous oxide were also detected in the film. Mechanistic details and possible implications for the chemistry of the polar atmosphere are discussed. (Auth. mod.)

I-55700

McCormick, M.P., Wang, P.H., Pitts, M.C., **Background stratospheric aerosol and polar stratospheric cloud reference models,** *Advances in space research,* 1996, 18(9/10), p.(9/10)155-(9/10)177, 19 refs.

A global aerosol climatology is evolving from the NASA satellite experiments SAM II, SAGE I, and SAGE II. In addition, polar stratospheric cloud (PSC) data have been obtained from these experiments over the last decade over both polar regions. This paper describes an updated reference model of the optical characteristics of the background aerosol and proposes a new aerosol reference model derived from the latest available data. The aerosol models are referenced to the height above the tropopause. The impact of a number of volcanic eruptions are described. In addition, a model describing the seasonal, longitudinal and interannual variations in PSCs will be presented. (Auth.)

I-55711

Jiang, D.Z., Wang, D.C., **Analysis for major weather features at the Great Wall Station of China in summer, Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.49-53, In Chinese with English summary. 2 refs.

DLC G845.5.C45 1989 Orien China

Results of weather observations at the Great Wall Station, and the analysis of meteorological data obtained during Chinese antarctic research expeditions, are presented. Two different types of weather patterns concerning snow, rain and strong winds, and the physical factors causing them, are discussed.

I-55712

Wang, D.C., Jiang, D.Z., **Preliminary analysis of the cyclone activity over the Antarctic Peninsula in summer,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.54-57, In Chinese with English summary. 3 refs.

DLC G845.5.C45 1989 Orien China

Analysis of cyclone activity based on meteorological data obtained from Dec. 1986 to Mar. 1987 on the Antarctic Peninsula shows that the track and strength of the cyclones are closely related to changes of the subtropical high and the antarctic cold high. A cyclone is obstructed and moves southeast when a subtropical high stretches south. Cyclones occurring south of the Great Wall Station result in strong northwesterly wind and rainfall. The cyclone track stretches north when a pronounced antarctic cold high occurs over the Antarctic Peninsula. Cyclones occurring north of the station result in strong easterly wind and snowfall.

I-55713

Luo, Y.J., Wang, B.G., **Case analysis of antarctic strong cyclone process,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.58-61, In Chinese with English summary.

DLC G845.5.C45 1989 Orien China

During the Jan. 1985 South Pacific cruise of the ship *Xiangyanghong 10,* a cyclone was observed between Jan. 23 and 27, showing maximum wind speed of about 34 m/s and creating 12 m-high waves. It is suggested that the strengthening of the subtropical high, and the formation of blocking anticyclones, created a favorable condition for two cyclones to merge into one.

I-55724

Chen, L.Q., Yang, X.L., Huang, J.H., **Sea-air exchange of sulfur, phosphorus, and nitrogen in marine aerosols over the Antarctic Peninsula waters,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.126-132, In Chinese with English summary. 16 refs.

DLC G845.5.C45 1989 Orien China

Results of studies of marine aerosols collected from the Pacific Ocean and the Antarctic Peninsula atmosphere show that the mean Na/Mg^{++} ratio of the aerosols is 8.5, close to the mean ratio of sea water, 8.6. Contents of sulfur, phosphorus and nitrogen in marine aerosols over the waters off the Antarctic Peninsula are controlled by natural processes such as sea-air exchange, biosphere-atmosphere exchange, weathering-atmosphere transport, or photochemical reactions. Non-seasalt sulfate (nss SO_4^{2-}) in the Antarctic Peninsula atmosphere can be traced to dimethylsulfide (DMS) caused by marine organism activity. The concentrations of water-soluble phosphorus are highest in the Antarctic Peninsula aerosols. Organic phosphorus shows a significant correlation with Na, suggesting that most of the organic P in marine aerosols comes from sea water.

I-55760

Chen, L.Q., Yang, X.L., Huang, J.H., **Sources and distribution of sulfate in the Pacific atmosphere,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.433-437, In Chinese with English summary. 31 refs.

DLC G845.5.C45 1989 Orien China

Thirty-one marine aerosol samples were collected during the period from Nov. 1984-Mar. 1985. The contents of sulfate and sodium in the samples were determined. The results indicate that the concentration of non-sea-salt sulfate (nss SO_4^{2-}) in marine aerosols decrease from the North Pacific to the South Pacific. A large portion of the nss sulfate in the North Pacific atmosphere comes from continental pollution sources through long-distance transport; the relatively low concentration of nss sulfate in marine aerosols over the South Pacific and the Antarctic may be attributed to an oceanic sulfate source due to marine biological processes. The sea-to-air flux of sulfur was calculated at a value of $0.065gS/(m^2 \cdot a)$ in Antarctic Peninsula waters. (Auth.)

I-55766

Australia. Bureau of Meteorology, **Antarctic compendium,** Melbourne, 1991, var. p.

DLC QC871.4.A67 1991

This compendium is a working guide to administrative and technical procedures followed by meteorological personnel attached to the Australian National Antarctic Research Expedition (ANARE) parties. Some material, e.g. that dealing with instrumental and observational practices, is supplementary to that contained in other Bureau of Meteorology Handbooks which are available for reference at permanent antarctic bases under Australian Government control.

I-55779

Banichevich, A., Fernández, W., **Modification of the ozone layer by human activities in polar regions** [La capa de ozono y su modificación por la actividad antropogénica: los huecos en las regiones polares], *Revista geofisica,* Jan.-June 1994, No.40, p.139-182, In Spanish with English summary. 107 refs.

Some characteristics of the absorption spectra of ozone and molecular oxygen, including singular properties of ozone formation and destruction in the atmosphere and other important properties of this triatomic molecule, are discussed. Heterogenic catalytic-chemical and dynamic processes, which are considered to be mainly responsible for the dramatic reduction in the production and regenaration of polar atmospheric ozone, are described. Also described are the geophysical, photophysical and chemical characteristics which, by air mass transport, convert the polar atmosphere into a storehouse of anthropogenic substances. (Auth. mod.)

I-55796

Kawamura, K., Semére, R., Imai, Y., Fujii, Y., Hayashi, M., **Water soluble dicarboxylic acids and related compounds in antarctic aerosols,** *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,721-18,728, 26 refs.

In this paper, the authors studied antarctic aerosol samples at Showa Station for low molecular weight dicarboxylic acids, ketocarboxylic acids, and α-dicarbonyls using gas chromatography and mass spectrometry. The aerosols were also analyzed for total carbon and nitrogen content. Molecular distributions of these water soluble organic compounds and a large increase of their concentrations during summertime are related. Also discussed is the source of the dicarboxylic acids in the antarctic aerosols, in comparison with their molecular distributions in the Arctic and in the Northern Hemisphere. (Auth. mod.)

I-55798

Santee, M.L., et al, **Chlorine deactivation in the lower stratospheric polar regions during late winter: results from UARS,** *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,835-18,859, Refs. p.18,856-18,859.

In this paper the authors use data from the Upper Atmosphere Research Satellite (UARS) to examine chlorine reservoir recovery in the lower stratospheric polar regions of both hemispheres. Microwave Limb Sounder (MLS) measurements of ClO within the polar vortices are correlated with simultaneous Cryogenic Limb Array Etalon Spectrometer (CLAES) observations of $ClONO_2$ and Halogen Occultation Experiment (HALOE) observations of HCl obtained shortly after the MLS and CLAES data. The authors analyze time series of vortex-averaged mixing ratios on two potential temperature surfaces (585 K and 465 K) in the lower stratosphere. Late-winter balance between the decay of reactive chlorine and the growth of chlorine reservoir species based on these data sets are presented, and the observational results with those from a chemical transport model are compared. (Auth. mod.)

I-55799

Chipperfield, M.P., et al, **Analysis of UARS data in the southern polar vortex in September 1992 using a chemical transport model,** *Journal of geophysical research,* Aug. 20, 1996, 101(D13), p.18,861-18,881, 41 refs.

The authors have used a new isentropic-coordinate three-dimensional chemical transport model to investigate the decay of ClO and evolution of other species in the antarctic polar vortex during Sep. 1992. The model is initialized using the available data from the Microwave Limb Sounder and Cryogenic Limb Array Etalon Spectrometer on the Upper Atmosphere Research Satellite (UARS). During the model initialization the chemical inconsistencies in the UARS data became evident. Sampling the observed species in the same way as the UARS instruments is important in removing any spurious trends due, for example, to changing solar zenith angle. While the model can reproduce the magnitude of the MLS ClO observations at 585 K, this is not possible at 465 K. The observations require that effectively all of the inorganic chlorine is in the form of ClO and $ClONO_2$ in the inner vortex at this altitude. The results indicate the potential importance of the speculative reaction between OH and ClO producing HCl for the recovery of HCl in the antarctic spring. The most significant discrepancy for O_3 is in the inner vortex at 465 K where the model underestimates the observed O_3 loss rate, especially when the effects of vertical motion are included. (Auth. mod.)

I-55800

Listing of temperatures at Arctic and Antarctic stations, *Climate monitor,* June 1994-Dec. 1994, 23(3-5), p.130-135.

This index lists periodic 1994 air temperatures at various antarctic stations.

I-55801

Antarctic regions surface air temperature anomalies, *Climate monitor,* June 1994-Dec. 1994, 23(3-5), p.151-155.

Antarctic surface air temperature data for 1994 are presented. This was the seventh coldest year on record (1957) over antarctic regions following last year's fourth coldest, and up until June there had been 14 consecutive colder than normal months. The greatest anomalies were found in the eastern Weddell Sea region where Halley Bay experienced its coldest year on record (anomaly -2.1°C).

I-55803

Ezat, U., Dulac, F., **Mineral aerosols at Amsterdam I. and dry deposition in the Indian Ocean** [Granulométrie des aérosols minéraux à l'Ile d'Amsterdam et retombées sèches dans l'océan Indien austral], *Académie des sciences, Paris. Comptes rendus. Série IIa,* Jan. 5, 1995, 320(1), p.9-14, In French with abridged English version. 11 refs.

The authors examined by microscope mineral particles from aerosol samples collected at Amsterdam I. The chemical composition of the aerosol particles differs from that of soil particles from the volcanic island, indicating a remote origin. The size distributions show a large fraction of small particles with an average diameter of about 1 micron, independent of the total abundance of particles. Median and mass-median diameters, and standard deviations of the particle size distributions, are larger than those observed in the central Pacific. Calculated dry deposition velocities show a large temporal variability around an average of 1-1.3 cm/s. The authors derived a dry deposition flux of mineral aerosol to the southern Indian Ocean of about 0.6 $g/m^2/yr$, larger by a factor of about 3 than the previous estimate. (Auth.)

I-55812

Schoeberl, M.R., **Stratospheric ozone depletion,** Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.59-65, 8 refs.

DLC QC981.8.C5G87

An important contribution to understanding the antarctic ozone hole has come from the total ozone observations made by the Total Ozone Mapping Spectrometer (TOMS) on board the polar orbiting Nimbus-7, launched in Nov. 1978. At this writing, TOMS has made over 4100 daily maps of the global total ozone distribution and the instrument is still in operation eleven years beyond its planned life-time. Not only has this instrument been valuable in understanding the antarctic ozone hole, but it has been used to map out nonpolar changes in the ozone layer as well. Large changes in the total column of ozone imply ozone loss in the lower stratosphere (10-30 km). At the time the ozone hole was discovered, stratospheric scientists were expecting anthropogenic ozone loss to take place first in the upper stratosphere (30-50 km) so the signal in total column ozone would be weak. Thus the spring depletion in antarctic ozone was a major surprise. This paper examines seasonal antarctic ozone depletion. (Auth. mod.)

I-55813

McCormick, M.P., **Stratospheric aerosols,** Atlas of satellite observations related to global change. Edited by R.J. Gurney et al, Cambridge, Cambridge University Press, 1993, p.67-77, 46 refs.

DLC QC981.8.C5G87

Continuous monitoring of stratospheric aerosols globally requires remote measurements from satellites. NASA launched a series of such satellite instruments beginning in Oct. 1978. The first was the Stratospheric Aerosol Measurement II (SAM II) instrument aboard Nimbus-7. The second long-term instrument was the Stratospheric Aerosol and Gas Experiment I (SAGE I) launched aboard the Applications Explorer Mission 2 spacecraft (AEM 2) in Feb. 1979, followed by SAGE II launched aboard the Earth Radiation Budget Satellite (ERBS) in Oct. 1984. This paper will focus on the measurements from SAM II and SAGE I and II, with some supporting lidar data. Both polar atmospheres are included in the analysis. (Auth. mod.)

I-55823

Bodhaine, B.A., **Central Antarctica: atmospheric chemical composition and atmospheric transport,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.145-172, Refs. p.167-172.

DLC QC879.6.C45 1996

A vast literature analysis is presented of studies on atmospheric transport and chemical composition of the antarctic atmosphere. A map of Antarctica is included showing major geographic features and some of the scientific stations. Some of the research stations, including Amundsen-Scott, providing meteorological data over many years, are described.

I-55824

Wagenbach, D., **Coastal Antarctica: atmospheric chemical composition and atmospheric transport,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.173-199, Refs. p.195-199.

DLC QC879.6.C45 1996

Snow fields of the coastal antarctic region are situated intermediately between the vast environmental regimes of the high antarctic plateau and that of the southern ocean. Since they are directly exposed to moist maritime air masses, a relatively high snow accumulation rate, associated with the deposition of mainly marine derived aerosol species, makes this region unique to recover high resolution ice core records that reveal the environmental and climatic history of the southern ocean. Several extensive ice core studies which have been, or are currently, performed in coastal antarctic regions are discussed.

I-55825

Davidson, C.I., Bergin, M.H., Kuhns, H.D., **Deposition of particles and gases to ice sheets,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.275-306, Refs. p.302-306.

DLC QC879.6.C45 1996

The deposition of particles and gases to ice sheets can occur by dry deposition, by wet deposition during formation and subsequent precipitation of snow, and by fog deposition. Each of these three mechanisms is discussed. The paper is essentially an update on descriptions of mechanisms presented in earlier reviews, with special attention given to recent advances in the understanding of deposition. The paper focuses on irreversibly depositing chemical species, beginning by presenting descriptions of the deposition mechanisms, with separate sections for dry, wet, and fog deposition. Experimental data illustrating these mechanisms for irreversible deposition are discussed. Finally, the authors summarize these findings and briefly discuss their implications for ice core research.

I-55826

Fuhrer, K., Hutterli, M., McConnell, J.R., **Overview of recent field experiments for the study of the air-snow transfer of H_2O and HCHO,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.307-318, 27 refs.

DLC QC879.6.C45 1996

The analysis of hydrogen peroxide and formaldehyde in ice cores offers the potential to reconstruct the oxidation capacity of the atmosphere in the past, since these species are closely linked to the odd H and the odd O budget of the atmosphere. The species are so-called reversibly deposited on the snow surface since they show a strong exchange with the gas phase after deposition and their ice concentrations are dominated to a large extent by postdepositional changes in the fim. Therefore, the transfer from the atmosphere into the snow is an important step in the overall transfer function of these species. To get a better understanding of this step, several field experiments were carried out during the 1993 and 1994 summer seasons at Summit in Central Greenland, in the 1993-94 austral summer in Antarctica along the Swedish traverse (SWEDARP), and the Amundsen-Scott Station in Nov. and Dec. 1994. The authors give an overview of the data and point out possible contradictions and knowledge gaps. (Auth.)

I-55830

Bintanja, R., Van den Broecke, M.R., **Turbulent exchange of momentum and scalars in the surface layer over antarctic snow and ice,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.491-515, 31 refs.

DLC QC879.6.C45 1996

Vertical profiles of wind speed, temperature and humidity were used to estimate the roughness lengths for momentum (z_0), heat (z_H) and moisture (z_Q) over antarctic surfaces. The data were obtained on a blue ice field in Queen Maud Land. The roughness lengths are generally used to compute the fluxes of momentum, heat and moisture from standard meteorological observations using the flux-profile relationships. The value of z_0 is easily evaluated from the wind speed profile. The scalar roughness lengths are evaluated using a new method which circumvents the difficult measurement of the surface temperature. It is found that the vertical exchange processes are strongly influenced by the saltating snow particles close to the surface during snow-drift events. The scalar roughness lengths seem to be approximately equal to z_0 for a large range of roughness Reynolds numbers, despite the frequent occurrence of drifting snow. It is suggested that snow-drift processes are important for the turbulent transport of scalar quantities such as heat and water vapor, and presumably also for the transport of other atmospheric constituents. (Auth.)

I-55833

Genthon, C., Armengaud, A., Krinner, G., **Climate and atmospheric tracers modelling with GCM, polar applications,** Chemical exchange between the atmosphere and polar snow. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.43. Edited by E.W. Wolff and R.C. Bales, Berlin, Springer-Verlag, 1996, p.573-579, 6 refs.

DLC QC879.6.C45 1996

The global distribution of atmospheric constituents (whether major or minor species, gas or aerosol, or even energy and momentum) is determined by the distribution of the sources, sinks, and conversion within the atmosphere, and by transport and mixing by the atmospheric circulation. General circulation models (GCMs) simulate on a global scale the transport and mixing of air, heat, moisture and momentum. The development and results of two purely physical (no chemistry involved) tracers/climate models based on existing GCMs are briefly described here, with emphasis on the polar ice sheets, some aspects of the ice-atmosphere transfer function, and model shortcomings. A third model is currently being setup on the basis of a new GCM, the characteristics of which are also presented. Data from antarctic stations are included.

I-55835

Bojkov, R.D., **Atmospheric ozone—an update,** *World Meteorological Organization. Bulletin,* Oct. 1990, 39(4), p.246-253.

This article addresses questions about global ozone changes, the antarctic ozone 'hole', the role of chlorofluorocarbons and future prospects for the stratospheric ozone layer. It is based on the two most recent international assessments published as WMO Ozone Reports Nos.18 and 20 (1990). (Auth. mod.)

I-55840

Gavrilov, A.A., Kaidalov, O.V., **Investigation of the interaction between variations in atmospheric thermal tides and anomalous ozone concentration,** *Advances in space research,* June 1996, 17(11), p.(11)157-(11)160, 8 refs.

This paper discusses the variations of atmospheric semidiurnal tidal parameters caused by global ozone anomalies of the antarctic ozone hole type, and establishes some regularities of their evolution. Analysis of preliminary data showed that the anomalous decrease of ozone in Oct. at high latitudes of the Southern Hemisphere results in a simultaneous abrupt drop of the semidiurnal tidal amplitude values at high latitudes of the lower thermosphere in the Northern Hemisphere. Inasmuch as such an abrupt decrease of amplitude values in the lower thermosphere in Oct. has been observed from experimental data since 1952, it is hypothesized that the antarctic ozone hole appeared at least not later than this time period. (Auth. mod.)

I-55845

Crutzen, P.J., ed, Gerard, J.C., ed, Zander, R., ed, Liège International Astrophysical Colloquium, 28th, June 26-30, 1989, **Our changing atmosphere,** Liège, Université de Liège, Institut d'Astrophysique, 1989, 534p., Refs. passim. For selected papers see 51-220 through 51-227 or I-55846 through I-55852 and J-55853.

DLC QC851.L44 1989

The 28th Liège Astrophysical Colloquium was devoted to chemical composition and radiative changes which have affected the Earth's atmosphere on a time scale of decades and centuries. The choice of this topic reflected not only the interest for a field of growing scientific, economic and sociological importance but also the wish to focus attention on the various observational and modeling programs presently carried out at the Institut d'Astrophysique de Liège in connection with these questions. Two current key issues have focused the world's attention on this field: the ozone depletion observed in the antarctic region, and the global warming associated with the enhanced greenhouse heating of the surface. Consequently, a substantial fraction of the presentations were devoted to these themes.

I-55846

Goldman, A., et al, **Recent results from analysis of high resolution infrared balloon-borne ground-based and laboratory spectra,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.99-105, 7 refs.

DLC QC851.L44 1989

A high resolution Michelson type interferometer system has been used to obtain infrared solar absorption spectra of the stratosphere during several recent balloon flights, as well as ground-based and laboratory spectra of molecules of stratospheric interest. The stratospheric spectra show numerous new spectral features of several important atmospheric trace gases such as O_3 (and isotopes), NO_2, HNO_3, $ClONO_2$, HNO_4, COF_2 and others in the 5-12 μm spectral region. Analysis of the new features shows that much of the available spectroscopic line parameters are inadequate, and new theoretical and laboratory studies are in progress, leading to more complete identification and quantification of stratospheric gases. Ground-based spectra in the 3-12 μm region, mostly at 0.02/cm resolution, have been obtained from several geographical locations such as Amundsen-Scott Station, New Zealand, Mauna Loa (Hawaii) and Colorado. These spectra and previous balloon-borne spectra at 0.02/cm resolution have provided quantification of several trace gases since 1980. (Auth.)

I-55847
Pommereau, J.P., Goutail, F., LeTexier, H., Jorgensen, T.S., **Stratospheric ozone and nitrogen dioxide monitoring at southern and northern polar latitudes,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.141-147, 2 refs.
DLC QC851.L44 1989

Ground-based spectrometers for long-term stratospheric monitoring have been installed permanently at the polar circle in both the Arctic and the Antarctic. Ozone and nitrogen dioxide columns are measured twice a day, morning and evening, at 90° solar zenith angle, regardless of the cloud cover. A comparison to simultaneous ozone observations from orbit by the TOMS experiment (Total Ozone Mapping Spectrometer) on board the satellite Nimbus 7 shows very good agreement between the two measurements at a time scale of a few days, but a shift of up to 30% in winter, the ground-based columns being larger than the satellite ones. Nitrogen dioxide columns display a significant seasonal variation, minimum in winter and maximum in summer; the diurnal variations are highest in spring and fall. The evening ozone column is found to be systematically reduced compared to that of the morning, by up to 5 to 7%. This is believed to be direct evidence of the occurrence of ozone destruction. (Auth. mod.)

I-55848
Stolarski, R.S., **Global ozone evolution,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.163-170, 13 refs.
DLC QC851.L44 1989

Global ozone evolution naturally divides itself into 3 problems; the Antarctic, the Arctic, and the rest of the globe. The antarctic springtime decrease since the mid 1970s is as much as 50% in the column amount and 90% in the local concentration, between 14 and 22 km altitude. The accepted primary cause is the increasing amount of chlorine in the stratosphere resulting from fluorocarbon release combined with the perturbing influence of polar stratospheric clouds in the Antarctic. A year-to-year variation occurs in the springtime decrease which appears to be associated with the quasi-biennial oscillation. Ozone in the Arctic behaves quite differently because of the greater activity of planetary wave disturbances and subsequent early breakdown of the polar vortex. Trend studies of total ozone at high northern latitudes have shown larger than expected negative changes and measurements have recently demonstrated perturbed chlorine chemistry in the north polar vortex. It is a reasonable speculation, but not proven, that the larger than expected north polar ozone decline is related to the existence of polar stratospheric clouds and perturbed chlorine chemistry. (Auth. mod.)

I-55849
Jadin, E.A., **Possible influence of long-term SST-anomalies on the eddy ozone transport,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.195-203, 15 refs.
DLC QC851.L44 1989

An analysis of the experimental data of ozone variability over Halley, Showa and Amundsen-Scott stations in Aug.-Nov. 1987 showed that the ozone decrease over the South Pole began in the end of Aug. during the antarctic polar night. It is suggested that the ozone increase in 1988 could be connected with quasi-biennial oscillations (QBO). The simple mechanism of the ozone and temperature QBO in high latitudes is discussed: this mechanism is based on the idea of the planetary wave reflection from zero wind line near the equator. Using the planetary wave model, the influence of sea-surface temperature (SST) variations on the eddy ozone coefficients is calculated. Results point qualitatively to the possible connection between supposed long-term changes in geographical positions of the world ocean's warm streams and observed interannual ozone anomalies in the atmosphere. (Auth. mod.)

I-55850
McCormick, M.P., **Global change in aerosols and PSCs,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.219-235, 16 refs.
DLC QC851.L44 1989

A long-term record of global stratospheric aerosols and PSCs is evolving from the SAM II and SAGE series of satellite instruments. In addition, lidar data and balloon-borne *in situ* data taken at various locations complement these aerosol data sets. Aerosols produced by volcanic eruptions have dominated the stratospheric aerosol loading over the last decade, with the Apr. 1982 eruption of El Chichon in Mexico causing the largest perturbation in the Northern Hemisphere during this century. The stratospheric aerosol loading has been decreasing since, with the Nov. 1985 eruption of Ruiz interrupting this decay. Aerosol loading in 1989 has not yet returned to the 1979 levels. Polar stratospheric clouds occur in wintertime at temperatures <200K in both polar regions. These clouds are a necessary ingredient in the production of the antarctic ozone hole due to heterogeneous chemistry and appear to be in phase with the westerly phase of the QBO. (Auth.)

I-55851
Berger, A., Fichefet, T., Gallée, H., Tricot, C., Marsiat, I., Van Ypersele, J.P., **Astronomical forcing of the last glacial-interglacial cycle,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.353-382, Refs. p.375-382.
DLC QC851.L44 1989

A zonal-sectorially averaged seasonal model has been developed for simulating the transient response of the climate system to astronomical forcing. The atmosphere is represented by a zonally averaged quasigeostrophic model which includes accurate treatment of radiative transfer. The atmospheric model interacts with the other components of the climate system (ocean, sea ice and land surface covered or not by snow and ice) through vertical fluxes of momentum, heat and water vapor. The model explicitly incorporates surface energy balances and has snow and sea-ice mass budgets. The vertical profile of the upper-ocean temperature is computed by an interactive mixed-layer model which takes into account the meridional convergence of heat. (Auth. mod.)

I-55852
Raynaud, D., Jouzel, J., Barnola, J.M., Chappellaz, J., **Interactions between greenhouse gases and climate over the last climatic cycle, as deduced from the Vostok ice core record,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.385-401, Refs. p.397-400.
DLC QC851.L44 1989

The 2 km-long ice core recovered at Vostok Station provides a unique record of different changes in atmospheric composition over the last climatic cycle (approximately the past 150,000 years). In particular the record includes changes in radiatively active gases (CO_2, CH_4). An effort is being made to evaluate the climatic contribution of the observed changes in these greenhouse gases. The role of climatically-induced changes in the biospheric and oceanic reservoirs as forcing these changes is discussed. (Auth.)

I-55871
IUrganov, L., **Atmospheric composition in polar regions,** Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, 8p + figs.

Global atmosphere is changing rapidly; its composition is perturbed already by a human activity. Consequences of this are numerous and cannot be predicted with certainty. Polar atmospheres have some peculiarities associated with low (practically zero) direct anthropogenic influence and specific atmospheric conditions. In some cases ("ozone hole", "arctic haze") anthropogenic impacts on polar environment are comparable with (or greater than) those observed in more populated areas. Beyond the scope of this review are numerous effects of atmospheric changes. These are, e.g., perturbations in different biological links, biomes, climatic impacts etc. (Auth. mod.)

I-55898

Hofmann, D.J., **1996 antarctic ozone hole,** *Nature,* Sep. 12, 1996, 383(6596), p.129, 8 refs.

This brief report provides an update on the status of stratospheric ozone loss over Antarctica. Measurements of Dobson Units over the South Pole region are cited and compared with those of prior years. The earlier effects of the QBO-related temperature changes and the Pinatubo aerosol appear to have ceased. The rate of ozone destruction over the South Pole is trending to be high in 1996.

I-55900

Battle, M., et al, **Atmospheric gas concentrations over the past century measured in air from firn at the South Pole,** *Nature,* Sep. 19, 1996, 383(6597), p.231-235, 51 refs.

The extraction and analysis of air from the snowpack (firn) at the South Pole provides atmospheric concentration histories of biogenic greenhouse gases since the beginning of the present century which confirm and expand on those derived from studies of air trapped in ice cores. Furthermore, calculations based on the inferred atmospheric concentrations of oxygen and carbon dioxide indicate that—in contrast to the past few years—the terrestrial biosphere was neither a source nor sink of CO_2 between ca. 1977 and 1985. (Auth.)

I-55901

Stearns, C.R., **Ross Island area wind field,** 10p. + additional figs., Unpublished report of a 1989 workshop, Port Hueneme, CA.

Presented here is information on the wind field in the Ross I. area and suggestions for deployment of additional automatic weather stations during the 1990-1991 field season. The purpose is to improve the forecasting and understanding of the weather conditions for aircraft operating from the area of the Ross Ice Shelf near McMurdo. Two or more years of experience with the present and additional AWS units will be needed before any significant improvement should be expected in forecasting weather conditions. In view of the future requirements for aircraft operations the AWS units should be in place as soon as possible. Then a significant effort should be directed towards the improvement of short-term weather forecasts. This will require synoptic workshops each year on the results of the previous season's weather forecasts for aircraft operations.

I-55903

Titus, J.G., Narayanan, V., **Risk of sea level rise,** *Climatic change,* June 1996, 33(2), p.151-212, Refs. p.209-212.

This paper estimates the probability distribution of future sea level rise implied by the subjective assessments of 20 climate and glacial process modelers regarding particular processes on which they have developed some expertise. Effects on the polar ice sheets are included. The results from combining all the models and reviewer assumptions are summarized and a procedure for projecting sea level at particular locations is presented. (Auth. mod.)

I-55914

Jones, P.D., ed, Bradley, R.S., ed, Jouzel, J., ed, **Climatic variations and forcing mechanisms of the last 2000 years,** North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I: Global environmental change, Vol.41, Berlin, Springer-Verlag, 1996, 649p., Refs. passim. Proceedings of a NATO Advanced Research Workshop held at Il Ciocco, Lucca, Italy, Oct. 3-7, 1994. For selected papers see 51-344 through 51-363 or F-55916 through F-55918, I-55915, I-55919 and I-55920.

DLC QC884.C59 1996

Based on high-resolution proxy records available for the past 2000 years, which is the period of most relevance to the next century and the study of the magnitude of natural climatic variability, this volume, a collection of papers presented at the Workshop, consists of 7 sections. Five sections consider, respectively, Dendroclimatology, Ice cores, Corals, Historical evidence, and Varved sediments. The final 2 sections consider the histories of various forcing factors, and attempts to bring records together from a variety of sources and provide explanations. The book ends with some conclusions and recommendations by the editors.

I-55915

Jouzel, J., Koster, R.D., Joussaume, S., **Climate reconstruction from water isotopes: what do we learn from isotopic models?,** Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.213-241, Refs. p.239-241.

DLC QC884.C59 1996

The documented distributions of HDO and $H_2{}^{18}O$ in modern precipitation show clear relationships between these concentrations and certain climatic variables. Of particular interest is the linear relationship, in middle and high latitudes, between mean annual isotope concentration and mean annual temperature at the precipitation site. Paleoclimatogists have used this relationship to infer paleotemperatures from isotope paleodata, which can be extracted, for example, for polar ice and high altitude tropical glaciers. Antarctic and Greenland data are shown in graphs. (Auth.)

I-55919

Raynaud, D., Barnola, J.M., Chappellaz, J., Martinerie, P., **Changes in trace gas concentrations during the last 2,000 years and more generally the Holocene,** Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.547-561, 25 refs.

DLC QC884.C59 1996

One possible forcing factor of the climate variability observed over the last 2,000 years is changing radiatively active trace gas concentrations in the atmosphere. Direct measurements of atmospheric trace gas concentrations over the last few decades indicate increasing global trends for CO_2, CH_4, N_2O and various halocarbons (CFCs), due to anthropogenic activities. Knowledge of the evolution of atmospheric trace gases for older periods arises mainly from the analysis of the air trapped in polar ice. The documentation of the 2,000 yr record is uneven. A large effort concerns the CO_2 and CH_4 records over the last millennium, which indicate fluctuations of about 10 ppmv for CO_2 and 70 ppbv for CH_4. The CO_2 and CH_4 records extended to the Holocene period show significant variations (up to about 40 ppmv for CO_2 and 150 ppbv for CH_4). Estimates of the climatic impact of such CO_2 and CH_4 fluctuations are given. Data concerning other less documented greenhouse trace gases, like N_2O or tropospheric ozone (over about the last 100 years), are also reviewed. (Auth. mod.)

I-55920

Jones, P.D., Briffa, K.R., **What can the instrumental record tell us about longer timescale paleoclimatic reconstructions?,** Climatic variations and forcing mechanisms of the last 2000 years. North Atlantic Treaty Organization. Advanced Science Institutes. NATO ASI Series I, Vol.41. Edited by P.D. Jones, R.S. Bradley, and J. Jouzel, Berlin, Springer-Verlag, 1996, p.625-644, 20 refs.

DLC QC884.C59 1996

Paleoclimatic data provide the only real estimates of past climatic variability on a decadal-to-century timescale for the last few millenia. Here the authors consider, through analyses of the instrumental data, how many evenly-spaced reconstructions would be required to estimate continental and hemispheric-scale average temperatures. The number required depends on the timescale of interest, with fewer required the longer the timescale. The ability of paleoclimatic reconstructions to record faithfully the course of climate variability similarly on all timescales is briefly considered. Data from both polar regions are cited. (Auth.)

I-55930

Wexler, H., **Additional comments on the warming trend at Little America, Antarctica,** *Weather,* Feb. 1961, 16(2), p.56-58, 3 refs.

It is the purpose of this note to include the additional year of 1958 in the trend study, to correct some of the previous data and to derive a trend based on smaller, but more comparable periods in each of the years. With regard to the latter point, difficulties arose when observations were taken aboard ships moored off-shore (Feb. and Mar. 1911, Jan. and Feb. 1929) and during Feb. 1934, when the first nine days were missing. These incomplete years can be studied by using nearly comparable 10-month periods omitting Feb. and Mar. of each year, to compute a second trend and by using strictly comparable 9-month periods, Apr. to Dec., to compute a third trend.

I-55949

Otto-Bliesner, B.L., **Initiation of a continental ice sheet in a global climate model (GENESIS),** *Journal of geophysical research,* July 27, 1996, 101(D12), p.16,909-16,920, 52 refs.

The initiation and maintenance of a continental ice sheet, including arctic and antarctic regions, are investigated using the GENESIS global climate model. A necessary condition for ice sheet initiation is to have snow cover survive through the summer. Model simulations examine the sensitivity of the maintenance of summer snow cover to the prescriptions of topography and solar luminosity. The time period chosen for this study is the Late Carboniferous (306 Ma) when an extensive continental ice sheet, as large if not larger than the Pleistocene glaciations, existed on a supercontinent in the Southern Hemisphere. This ice sheet, persisting for over 60 m.y., was one of the most prolonged periods of continuous glaciation in Earth history. Model simulations indicate that given the geography, solar luminosity (3% less than present), and atmospheric CO_2 (same as present) estimated for this time period, summer snow cover remains as far equatorward as 35°S latitude. Global mean temperature is -2.4°C, 17.2°C cooler than for present. Probable regions for the initiation of the Carboniferous ice sheet are apparent in analysis of the spin-up of the model to equilibrium. Summer snow cover first persists along the polar coastline of the supercontinent during year 4 of the simulation. Summer snow cover shows the greatest sensitivity to solar luminosity. Reducing land elevations to sea level causes persistent summer snow cover to retreat only 8° poleward. Conversely, initializing the model with an elevated land ice sheet has no effect on summer snow cover extent. (Auth. mod.)

I-55951

Walsh, K., McGregor, J.L., **Simulations of antarctic climate using a limited area model,** *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,093-19,108, 50 refs.

A limited area model is nested within the European Centre for Medium-Range Weather Forecasts (ECMWF) analyses and climate simulations are performed for July at a resolution of 125 km for a domain located over the continent of Antarctica. The model displays negative biases of mean sea level pressure off the coast of East Antarctica, and positive biases in other oceanic regions close to the coast of the continent. The model simulation of snow accumulation is good; the observed positive gradient of accumulation between the center of Antarctica and the coast is reproduced well, although precipitation is generally too high over regions of significant orography. Comparison between simulations performed with and without oceanic leads shows that leads increase sensible and latent heat fluxes over regions of sea ice, and increase accumulation over the continent of Antarctica. The effects of the introduction of leads into the limited area model are consistent with the results of similar general circulation model sensitivity tests previously performed. (Auth. mod.)

I-55952

Cullather, R.I., Bromwich, D.H., Van Woert, M.L., **Interannual variations in antarctic precipitation related to El Niño-Southern Oscillation,** *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,109-19,118, 67 refs.

The accurate estimation of antarctic precipitation variability is an essential component in understanding global sea level fluctuations; direct measurement techniques, however, are replete with practical difficulties. In this study, net precipitation (precipitation minus sublimation) for the antarctic continent is computed for 1980-1994 using operational numerical analyses obtained from the ECMWF (European Centre for Medium-Range Weather Forecasts). The resulting estimations reveal a strong interannual variability for the antarctic continent, implying a ±1.2-1.5 mm/yr maximum range in the antarctic eustatic change contribution. In particular, variability for the South Pacific sector is shown to be correlated with the El Niño-Southern Oscillation (ENSO) phenomenon for 1980-1990. The relation becomes anticorrelated after 1990, associated with a strong East Antarctic ridging pattern that coincides with the start of the prolonged series of warm events of the early 1990s. This result is relevant to other studies relating ENSO variability to high southern latitudes, and a more elaborate picture of this teleconnection pattern is presented. (Auth. mod.)

I-55953

King, J.C., Anderson, P.S., Smith, M.C., Mobbs, S.D., **Surface energy and mass balance at Halley, Antarctica during winter,** *Journal of geophysical research,* Aug. 27, 1996, 101(D14), p.19,119-19,128, 28 refs.

The authors present measurements of the components of the energy and mass balance of the snow surface at Halley Station. During the winter months, when insolation is small or zero, the surface energy balance is dominated by radiative cooling. This is mostly balanced by a downward transport of atmospheric sensible heat, with an upward conductive flux of heat through the snowpack making a secondary contribution. The average flux of atmospheric latent heat is downward but of negligible importance in the surface energy balance. During the winter, a significant imbalance is seen in the measured energy budget, with insufficient sensible and conductive heat fluxes to balance the radiative cooling. The wintertime surface mass balance is dominated by precipitation. Sublimation of blowing snow makes a small negative contribution to the budget and is observed to be highly dependent on wind speed. It is suggested that this may be an important mechanism for removing surface mass in some parts of Antarctica. (Auth. mod.)

I-55967

Karol', I.L., Kiselev, A.A., Frol'kis, V.A., **Model reconstruction of the composition and temperature of the global troposphere and stratosphere in the last glacial and interglacial periods,** *Russian Academy of Sciences. Transactions. Earth science sections,* 1994 (Pub. 1995), 339(8), p.21-26, Translated from Rossiĭskaia Akademia Nauk. Doklady. 12 refs.

A quantitative reconstruction is presented of the composition of minor gases (most importantly ozone) in the troposphere and stratosphere in certain periods of the history of the atmosphere, using the one-dimensional radiative and photochemical model (RPM), with refinements in the radiative part of the model. The use of a one-dimensional, horizontally averaged RMP is justified not only by the approximate lateral uniformity of present $[CO_2]$, $[CH_4]$, and $[N_2O]$ distribution in the lower troposphere, but also by the fact that the measured concentrations of these gases in the old ice of cores from the widely separated Antarctic and Greenland ice caps are roughly equal. In the photochemical part of this model, the water vapor concentration $[H_2O]$ in the troposphere is determined by the specified relative humidity and is calculated for the stratosphere. The model envisages 141 reactions of 42 compounds, of which 20 are in photochemical equilibrium, and corrections are introduced to produce averaging of their daily concentration variations. (Auth. mod.)

I-55978

Handorf, D., **Parameterization of the stable atmospheric boundary layer over an antarctic ice shelf** [Zur Parametrisierung der stabilen atmosphärischen Grenzschicht über einem antarktischen Schelfeis], *Berichte zur Polarforschung,* 1996, No.204, 133p., In German with English summary. 99 refs.

The stable atmospheric boundary layer has been investigated on the basis of two extended boundary-layer experiments performed at the German antarctic research station Neumayer. Almost all parameterizations of the turbulent exchange in atmospheric models (from boundary-layer models up to global circulation models) are based on hydrodynamic theories and empirical laws (universal functions), which are valid above horizontal homogeneous surfaces. The conditions at the Neumayer Station allow the test of such theories as well as their further development. In this thesis empirical and theoretical investigations of parameterizations of the surface fluxes, the turbulent fluxes in the whole boundary layer and of the height of the stable boundary layer are performed. (Auth. mod.)

I-55983
Van Allen-Heuberger, R., **Atmospheric thermal radiation over the South Pole,** *Zürcher Geographische Schriften,* 1995, No.61, 109p., With German summary. Refs. p.86-88.

Year-round measurements of mid-infrared atmospheric emission were conducted at the Amundsen-Scott Station during 1990, 1992 and 1993. The spectra were analyzed for information about stratospheric chemistry, precipitable water content and thermal emission of clouds, blowing snow and ice crystals. The data presented in this thesis are from 1992. The low water vapor content of the atmosphere at the South Pole allows the observation of stratospheric gases and the change in their concentration during the long absence of sunlight of the austral winter. The precipitable water vapor for clear-sky cases was calculated and a good correlation with the surface temperature was found. The values range from 0.2-0.8 mm and agree with the yearly average of the radiosonde data. A large seasonal change of the total column of nitric acid (HNO_3) vapor was observed. During the austral summer, the HNO_3 column abundance was about $2x10^{16}$ molecules/cm^2. There was a small increase in the fall. A rapid decrease of 50% was observed in late June. By early July, the stratospheric temperature was cold enough to form type II PSCs, and the HNO_3 column decreased to $7x10^{15}$ molecules/cm^2. Measured nitric acid values in the spring remained extremely low even after the stratosphere warmed well above PSC temperatures. This may indicate permanent removal of HNO_3 by gravitational settling, or long-term sequestering in large particles. (Auth. mod.)

I-55987
Hurtak, J.J., **Global progress on problems of ozone depletion,** Intersociety Energy Conversion Engineering Conference, 28th, Atlanta, GA, Aug. 8-13, 1993. IECEC 1993. Proceedings. Vol.2, Washington, D.C., American Chemical Society, 1993, p.2.19-2.25, Refs. p.2.24-2.25.

DLC TK2896.I55a 1993

Global studies have been continually underway using airborne and satellite imaging of the ozone depletion. These measurements along with the Dobson network and balloon sonde experiments continue to monitor the extent of ozone depletion over the Antarctic and the Arctic and other chemical changes in the stratosphere. CFCs are not the only contributing factor to ozone depletion, but play a major role along with volcano aerosol emissions and other meteorological factors. Colder climates in Antarctica leads to the formation of PSCs that do not appear in the Northern Hemisphere. PSCs are a central platform for the formation of atomic chlorine and chemistry that leads to ozone destruction.

I-55991
Andreas, E.L., **Atmospheric boundary layer over polar marine surfaces,** *U.S. Army Cold Regions Research and Engineering Laboratory. Monograph,* June 1996, 38p., ADA-313 642, Refs. p.34-38.

The Atmospheric Boundary Layer (ABL) over polar marine surfaces is, in ways, simpler and, in other ways, more complex than ABLs in other environments. It is simpler because topographic effects are rarely a concern, the surface is fairly homogeneous, and roughness lengths over sea ice and the ocean are much smaller than they are over land. It is complex because the stratification is usually stable, and stable ABLs have not yielded to quantification as readily as convective ABLs have. This report reviews some of these characteristics of ABLs over polar marine surfaces, including the Weddell Sea. The ABL, by definition, is the turbulent layer between the Earth's surface and the (generally) nonturbulent free atmosphere. Hence, the emphasis is on turbulence processes—in particular, the turbulent transfer of momentum and sensible and latent heat over sea ice. As such, this report reviews both the theoretical and observational bases for the understanding of the mean structure of the ABL. Understanding this structure then allows predicting the turbulent surface fluxes of momentum and sensible and latent heat. (Auth.)

I-55994
Brenninkmeijer, C.A.M., et al, **Large ^{13}CO deficit in the lower antarctic stratosphere due to "ozone hole" chemistry: part I, observations,** *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2125-2128, 20 refs.

Isotope and concentration measurements are reported for CO and CH_4 in air collected in the upper troposphere and lower stratosphere between New Zealand and Antarctica in Oct. 1993. The $^{13}C/^{12}C$ ratio of CO for the stratospheric samples are much lower than all previously reported atmospheric values. The measurements manifest a very steep decrease in $\delta^{13}C$ with declining CO. This large isotope shift is caused by the local production of several ppbv of extremely depleted CO. Not only is CH_4 itself a ^{13}C depleted precursor of CO, but the recently discovered large fractionation in $Cl + CH_4$ and the availability of free Cl during ozone hole conditions causes the effect. (Auth. mod.)

I-55995
Müller, R., Brenninkmeijer, C.A.M., Crutzen, P.J., **Large ^{13}CO deficit in the lower antarctic stratosphere due to "ozone hole" chemistry: part II, modeling,** *Geophysical research letters,* Aug. 1, 1996, 23(16), p.2129-2132, 26 refs.

Recently, isotopically extremely light CO was found in whole air samples from the antarctic lower stratosphere (Part I). To investigate the cause of these unprecedented observations, a photochemical model is used to simulate the typical history of air masses at polar latitudes in the lowermost stratosphere over austral winter and spring. The model results show that the observations may be explained by the very efficient isotope fractionation in the reaction R1:$CH_4 + Cl \rightarrow HCl + CH_3$. Extremely high levels of Cl atom concentrations prevail in the polar lower stratosphere in austral spring for a period of about 10 days after most ozone is lost. Therefore, R1 becomes very efficient, leading to a very high rate of buildup of HCl and an unusually high isotopic CO fractionation. (Auth. mod.)

I-56007
Haan, D., Martinerie, P., Raynaud, D., **Ice core data of atmospheric carbon monoxide over Antarctica and Greenland during the last 200 years,** *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2235-2238, 27 refs.

The first polar ice core measurements of carbon monoxide compatible with atmospheric data were obtained using an improved experimental protocol. A new CO extraction method has been developed with special care to eliminate any CO contamination. The procedure has been applied to ice core samples originating from Antarctica and Greenland in order to reconstruct past CO variations over the last 200 years. Consistent results in terms of atmospheric concentrations are obtained. The authors found that CO concentration started to increase over Greenland around 1850; by constrast, CO levels at high southern latitudes remained fairly constant between 1860 and 1916. Based on available data on past CO sources, a scenario is proposed for the CO increase observed in Greenland. In addition, these Greenland CO results suggest that simulations of preindustrial CO distribution could have underestimated CO concentrations mainly in the Northern Hemisphere leading to an overestimate of the change since preindustrial times, and to an underestimate of the past interhemispheric gradient of carbon monoxide. (Auth. mod.)

I-56010
Olivero, J.J., et al, **Distinctive ozone structure in the high-latitude stratosphere: measurements by the Millimeter-wave Atmospheric Sounder,** *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2309-2311, 13 refs.

MAS (Millimeter-wave Atmospheric Sounder) observations from the shuttle ATLAS spacelab pallet have revealed some little known structure in stratospheric ozone mixing ratio profiles at sub-polar latitudes of both hemispheres. Qualitatively similar features are observed by UARS instruments. Another possibly related feature has been observed by ground-based remote sensing from the South Pole over an extended season. In all these cases, it seems likely that active photochemistry and highly structured horizontal and vertical transport play important roles. Some evidence of a similar feature is also present in a current 2-D photochemical model. (Auth. mod.)

I-56011
Abrams, M.C., et al, **ATMOS/ATLAS-3 observations of long-lived tracers and descent in the antarctic vortex in November**

1994, *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2341-2344, 12 refs.

Observations of the long-lived tracers N_2O, CH_4 and HF obtained by the Atmospheric Trace Molecule Spectroscopy (ATMOS) instrument in early Nov. 1994 are used to estimate average descent rates during winter in the antarctic polar vortex of 0.5 to 1.5 km/month in the lower stratosphere, and 2.5 to 3.5 km/month in the middle and upper stratosphere. Descent rates inferred from ATMOS tracer observations agree well with theoretical estimates obtained using radiative heating calculations. Strong horizontal gradients of tracer mixing ratios, the presence of mesospheric air in the vortex in early spring, and the variation with altitude of inferred descent rates indicate that the antarctic vortex is highly isolated from mid-latitudes throughout the winter from approximately 20 km to the stratopause. The 1994 antarctic vortex remained well isolated between 20 and 30 km through at least mid-Nov. (Auth. mod.)

I-56012

Rinsland, C.P., et al, **ATMOS/ATLAS-3 measurements of stratospheric chlorine and reactive nitrogen partitioning inside and outside the November 1994 antarctic vortex,** *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2365-2368, 16 refs.

Partitioning between HCl and $ClONO_2$ and among the main components of the reactive nitrogen family has been studied inside and outside the antarctic stratospheric vortex based on ATMOS profiles measured at sunrise during the Nov. 3-12, 1994 ATLAS-3 Shuttle mission. Model calculations reproduce the higher levels of HCl and NO_x ($NO + NO_2$) inside the lower stratospheric vortex both driven by photochemical processes initiated by low O_3. The high HCl at low O_3 results from chemical production of HCl via the reaction of enhanced Cl with CH_4, limited production of $ClONO_2$, and the descent of inorganic chlorine from higher altitudes. (Auth. mod.)

I-56013

Rinsland, C.P., et al, **ATMOS measurements of H_2O+2CH_4 and total reactive nitrogen in the November 1994 antarctic stratosphere: dehydration and denitrification in the vortex,** *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2397-2400, 24 refs.

Simultaneous stratospheric volume mixing ratios measured inside and outside the antarctic vortex by the Atmospheric Trace Molecule Spectroscopy (ATMOS) instrument in Nov. 1994 reveal previously unobserved features in the distributions of total reactive nitrogen and total hydrogen. Maximum removal of NO_y due to sedimentation of polar stratospheric clouds (PSCs) inside the vortex occurred at a potential temperature of 500-525 K, where values were 5 times smaller than measurements outside. Maximum loss of H_2O+2CH_4 due to PSCs occurred in the vortex at 425-450 K. The antarctic and Apr. 1993 arctic measurements by ATMOS show no significant differences in volume mixing ratios outside the vortices in the two hemispheres. (Auth. mod.)

I-56014

Manney, G.L., Swinbank, R., O'Neill, A., **Stratospheric meteorological conditions for the 3-12 Nov 1994 ATMOS/ATLAS-3 measurements,** *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2409-2412, 11 refs.

During the ATLAS-3 mission (Nov. 3-12, 1994) United Kingdom Meteorological Office fields show that the Southern Hemisphere (SH) vortex was still strong below about 700 K, with coherent vortex fragments apparent up to about 1300 K. The SH vortex was shifted off the pole toward 270°E throughout ATLAS-3, although its shape varied from day to day. SH temperatures were increasing during ATLAS-3; temperatures below 188 K were last seen 35-45 days before the mission, but were below 195 K as late as Nov. 2, 1994. The Northern Hemisphere (NH) polar vortex had developed at levels above about 550 K. Simulated high-resolution potential vorticity fields clearly show low latitude air being drawn up around the polar vortices in both hemispheres. These fields indicate that meteorological analyses underestimate the amount of atmospheric variability, including the strength of local PV gradients, and small-scale structure. (Auth. mod.)

I-56022

Chen, B., Smith, S.R., Bromwich, D.H., **Evolution of the tropospheric split jet over the South Pacific Ocean during the 1986-89 ENSO cycle,** *Monthly weather review,* Aug. 1996, 124(8), p.1711-1731, 55 refs.

A case study investigation into the meridional and horizontal circulation over the South Pacific Ocean, including Antarctica, is presented for the 1986-89 El Niño-Southern Oscillation (ENSO) cycle. Analysis of the momentum budget reveals how the split jet in the upper troposphere over South Pacific Ocean evolved during the 1986-89 ENSO cycle. The variations in the split jet may reflect the poleward propagation of the ENSO signal via the South Pacific convergence zone. The implications for the high southern latitudes are discussed as interannual variations are found in the low-level easterlies near Antarctica and the Amundsen Sea low. (Auth. mod.)

I-56023

Lienesch, J.H., et al, **Validation of NOAA-9 SBUV/2 total ozone measurements during the 1994 antarctic ozone hole,** *Geophysical research letters,* Sep. 15, 1996, 23(19), p.2593-2596, 13 refs.

The Solar Backscatter Ultraviolet (SBUV/2) instrument on the NOAA-9 spacecraft made total ozone measurements over Antarctica during the 1994 Austral Spring depletion. To validate the NOAA-9 ozone measurements, daily zonal ozone averages from NOAA-9 and NOAA-11 measurements in the Northern Hemisphere have been compared. Comparisons have also been made with ground-based measurements from five Dobson stations dispersed on the antarctic continent. The results show that the NOAA-9 data agree to within 1-2% with the Dobson stations. This agreement makes possible not only a continuation of the antarctic measurements without a large instrument-related bias, but also establishes the NOAA-9 data as a suitable transition data set during the replacement of NOAA-11 by NOAA-14. (Auth. mod.)

I-56025

Beyer, K.D., Seago, S.W., Chang, H.Y., Molina, M.J., **Correction to "Composition and freezing of aqueous H_2SO_4/HNO_3 solutions under polar stratospheric conditions" by K.D. Beyer, S.W. Seago, H.Y. Chang and M.J. Molina,** *Geophysical research letters,* Sep. 15, 1996, 23(19), p.2715, 1 ref. For pertinent paper see 49-5904 or 231-53285.

In the paper "Composition and Freezing of aqueous H_2SO_4/HNO_3 solutions under polar stratospheric conditions" by K.D. Beyer et al. *(Geophysical Research Letters,* 21(10), 871-874, 1994) the text should be amended to the section "Parameterization of the vapor pressure data," as indicated. (Auth. mod.)

I-56029

Southern Hemisphere 500mb anomalies, *Climate monitor,* Dec. 1989-Dec. 1990, 19(1-5), p.51-57.

Based on data from the Bureau of Meteorology, Melbourne, highlights and graphs of the Southern Hemisphere 500mb anomalies (gpdm) between Dec. 1989 and Nov. 1990, are presented.

I-56030

Antarctic regions surface air temperature anomalies, *Climate monitor,* Dec. 1989-Dec. 1990, 19(1-5), p.66-73.

From British Antarctic Survey and Australian Antarctic Division data, graphs and a short analysis of surface air temperature anomalies in Antarctica, between Dec. 1989 and Nov. 1990, are presented.

I-56031

Listing of temperatures at Arctic and Antarctic stations, *Climate monitor,* Dec. 1989-Dec. 1990, 19(1-5), p.74-83.

Tables showing arctic and antarctic stations and their coordinates, and temperatures recorded at the stations from Dec. 1989 through Nov. 1990, as well as mean temperature values for the same period, are presented.

I-56042

Berland, B.S., Foster, K.L., Tolbert, M.A., George, S.M., **UV absorption spectra of H_2O/HNO_3 films,** *Geophysical research* *letters,* Oct. 1, 1996, 23(20), p.2757-2760, 22 refs.

The ultraviolet (UV) absorption spectra were measured for amorphous and crystalline H_2O/HNO_3 films representative of polar stratospheric clouds. Film compositions were determined using laser induced thermal desorption. Pure HNO_3 films showed a broad absorption peak with a maximum absorbance at $\lambda \approx 195$ nm. The absorbances of amorphous H_2O/HNO_3 films were also broad and peaked at $\lambda = 196\text{-}198$ nm. The absorption cross sections increased slightly for more dilute films, although the band shape was nearly independent of the H_2O content. The major absorbing species in crystalline hydrates is also NO_3^- and thse films all had very similar UV absorption spectra. (Auth. mod.)

I-56060

Schoeberl, M.R., et al, **Development of the antarctic ozone hole,** *Journal of geophysical research,* Sep. 20, 1996, 101(D15), p.20,909-20,924, 55 refs.

A Lagrangian chemical model is used to simulate the formation of the antarctic "ozone hole": the decrease in high-latitude Southern Hemisphere ozone between mid-Aug. and mid-Sep. of each year. The model benchmark simulation of HNO_3, $ClONO_2$, ClO, and ozone for Sep. 17, 1992, is in good agreement with UARS observations. Simulations of the ozone column over the years 1979-1994 show quantitative agreement with the secular decline in antarctic ozone and change in the area of the ozone hole as observed by the total ozone mapping spectrometer. The model calculates that the antarctic ozone loss and ozone hole area both increased linearly with time after the early 1970s until the early 1990s. After the early 1990s the growth of the area of the ozone hole slows as a result of the slowing of the growth rate of total inorganic chlorine. A hypothetical doubling of the 1992 atmospheric chlorine amount would expand the ozone hole to the very edge of the polar vortex. (Auth. mod.)

I-56061

Klein, U., Crewell, S., De Zafra, R.L., **Correlated millimeter wave measurements of ClO, N_2O, and HNO_3 from McMurdo, Antarctica, during polar spring 1994,** *Journal of geophysical research,* Sep. 20, 1996, 101(D15), p.20,925-20,932, 24 refs.

Ground-based observations of stratospheric ClO, N_2O, and HNO_3 were made at McMurdo Station during the austral spring of 1994, using two separate microwave receivers. In early Sep., McMurdo was located well inside the polar vortex, and high mixing ratios of chlorine monoxide were measured in the lower stratosphere. Because of vortex movement, later measurements were taken in edge regions, where ClO was found to be quite variable. This vortex movement also provided an opportunity to study relative changes between all three species. Almost no HNO_3 was seen below 20 km during the measurement period, indicating that stratospheric air had been efficiently denitrified by polar stratospheric cloud formation. A significant increase of the nitric acid column was observed only around Sep. 20, when McMurdo was closer to the outer edge of the vortex. Subsidence continued in the stratosphere over McMurdo Station until at least early Oct., when measurements were stopped. (Auth. mod.)

I-56062

Ackerman, S.A., **Global satellite observations of negative brightness temperature differences between 11 and 6.7 μm,** *Journal of the atmospheric sciences,* Oct. 1, 1996, 53(19), p.2803-2812, 24 refs.

Global analyses of satellite spectral observations indicate the existence of negative brightness temperature differences when cold scenes are viewed. In July, more than 60% of the observations over the antarctic plateau had $BT_{11}\text{-}BT_{6.7} < -5$ K. In Jan., over Greenland, the frequency of occurrence is approximately 20%. Three factors are investigated that may contribute to these observed negative brightness temperature differences: 1) calibration errors, 2) nonuniform scenes within the field of view, and 3) physical properties of the observed phenomena. A doubling and adding radiative transfer model is used to investigate the physical explanations of the negative differences. The model simulations are capable of producing large negative differences over high-altitude polar regions. Distinguishing clear and cloudy regions from satellite infrared radiances is a challenging problem in polar winter conditions. Brightness temperature differences provide a technique to separate cold, optically thick clouds from clear-sky conditions when strong radiation inversions exist at the surface. Further evidence that the large negative values of $BT_{11}\text{-}BT_{6.7}$ are associated with surface inversions is presented by comparing the satellite observations with surface temperature measurements from an antarctic automated weather station. (Auth. mod.)

I-56130

Oelke, C., **Influence of the atmosphere on the remote sensing of sea ice using passive microwave radiometers** [Atmosphäreneinfluß bei der Fernerkundung von Meereis mit passiven Mikrowellenradiometern], *Berichte zur Polarforschung,* 1996, No.208, 117p., In German with English summary. 76 refs.

Significant errors in estimating short-time variations and climatological concentration trends occur due to clouds and water vapor. For the assessment of these weather effects on sea ice concentration, the atmospheric parameters integrated water vapor content (W) and cloud liquid water path (LWP) are derived from radiosonde ascents measured over Weddell Sea ice in 1992. Using a microwave radiative transfer model and typical surface emissivities, brightness temperatures are calculated from the radiosonde ascents. The first-year, multiyear and total sea-ice concentrations are calculated using the NASA team sea-ice algorithm for the SSM/I radiometer. The results of the model study indicate that the presence of cloud liquid water increases estimates of total sea-ice concentration by the same magnitude as the presence of water vapor, i.e. up to +10%, depending on surface type (open ocean, first-year ice, multiyear ice). Estimates of the multiyear ice concentration are reduced by up to 80% by cloud liquid water whereas the water-vapor effect is smaller (up to -6%). The combined effect of LWP and W is less than the algebraic sum of the two. The importance of using realistic measurements of atmospheric conditions in the polar sea-ice area is investigated in detail for different vertical water-vapor profiles and various cloud bases and cloud heights. (Auth. mod.)

I-56132

Kot, A.I., Liudchik, A.M., Krasovskiĭ, A.N., Cherniavskiĭ, A.F., **Global operational monitoring of atmospheric ozone from space,** *Soviet journal of remote sensing,* 1992, 10(1), p.109-120, Translated from Issledovanie Zemli iz Kosmosa. 12 refs.

DLC G70.4.I882 1992

The paper describes the use of satellite observations of the distribution pattern of atmospheric radiant intensities in the UV area for operational monitoring of the state of the ozone layer. The effectiveness of the method is illustrated by model calculations. Detailed information about the state of the ozone layer over Antarctica has been obtained using devices on board Nimbus 7. It is suggested that one significant addition to existing methods would be the possibility of constant global monitoring of the whole south polar zone from a satellite in a very high polar orbit, to measure the distribution of the intensity of the UV brightness of the atmosphere. (Auth. mod.)

I-56138

Russell-Head, D., Simmonds, I., **Temporal structure of surface weather parameters at Casey, Davis, Mawson and Macquarie Island,** *University of Melbourne, School of Earth Sciences. Publication,* Sep. 1993, No.35, 181p., 4 refs.

This report presents the three-hour surface observation record for four Australian stations in the antarctic region in the form of yearly graphs. The layout of the graphs has been kept to a standard to facilitate inter-year and inter-station comparisons. Temperature, pressure and wind speed data are presented as continuous traces. Wind direction and cloud amount data are presented as point plots. The monthly means and yearly means of temperature, pressure, wind speed and cloud amount are presented in numerical form for each year. All the data for the five parameters are presented on a single page to provide a concise picture—in graphs and numbers—of the year's record at a particular station.

I-56140

Gallée, H., **Mesoscale atmospheric circulations over the southwestern Ross Sea sector, Antarctica,** *Journal of applied meteorology,* July 1996, 35(7), p.1129-1141, 31 refs.

In this study the mesoscale atmospheric circulation over the southwestern Ross Sea sector during winter is examined. The hydrostatic atmospheric model MAR is used. The impact of a partial sea-ice cover on the atmospheric circulation is assessed by prescribing lead fractions in the range of the observed values. Simulations show that the propagation of katabatic airstreams over Terra Nova Bay is facilitated by the presence of leads because the identity of cold, dense, katabatic air is better marked in warmer environmental maritime conditions. Taking into account that such a lead fraction is situated in the upper range of the observed values in the central Ross Sea during winter, these results suggest that winter Ross Sea mesocyclones could not always result from a pure mesoscale forcing. It is also found that the position of the simulated mesocyclone over Terra Nova Bay is not sensitive to the lead fraction. Furthermore, this meteorological situation favors the advection of relatively mild and moist maritime air over a long distance in the ice-sheet interior. This process, which is referred to as a moist-air intrusion, could affect the antarctic ice-sheet mass balance. (Auth. mod.)

I-56141

Gallée, H., Pettré, P., Schayes, G., **Sudden cessation of katabatic winds in Adélie Land, Antarctica,** *Journal of applied meteorology,* July 1996, 35(7), p.1142-1152, 36 refs.

The evolution of summer katabatic wind events over the steep slopes of Adélie Coast is examined, with emphasis on the sudden cessation of these events. Different idealized large-scale forcings are considered, including a situation that comes very close to one observed during Nov.-Dec. 1985. The hydrostatic atmospheric model MAR is used to assess the sensitivity of the simulated cessation process to a prescribed large-scale forcing. (Auth. mod.)

I-56154

Bailey, P.L., et al, **Comparison of cryogenic limb array etalon spectrometer (CLAES) ozone observations with correlative measurements,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9737-9756, 41 refs.

Ozone measurements made by the CLAES onboard UARS are compared to nearly coincident correlative measurements taken in 1992 and 1993 and to mean ozone distributions observed by other satellite instruments during past missions. This paper describes the CLAES measurement characteristics, uncertainties, predicted, and observed precisions and compares the observations with independent measurements both qualitatively and statistically. Satellite- and ground-based remote sensing as well as balloon-bome *in situ* measurements are represented in the correlative data set. The CLAES data are shown to be within ±20% of ll correlative measurements between 0.5 and 30 mbar. Differences at lower altitudes may be related to effects of the Pinatubo aerosol on certain of the correlative measurements and the CLAES retrieval. Comparisons with historical data from the LIMS, SAGE II, and SBUV instruments indicate good agreement with the spatial and seasonal ozone distributions seen by CLAES. The spacecraft is yawed 180° approximately every 36 days. CLAES thus obtains altemating coverage, either approximately 32°N to 80°S or 32°S to 80°N depending on the UARS flight direction. (Auth. mod.)

I-56155

Massie, S.T., et al, **Validation studies using multiwavelength Cryogenic Limb Array Etalon Spectrometer (CLAES) observations of stratospheric aerosol,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9757-9773, 30 refs.

Validation studies of multiwavelength CLAES observations of stratospheric aerosol are discussed. An error analysis of the CLAES aerosol extinction data is presented. Aerosol extinction precision values are estimated at latitudes and times at which consecutive UARS orbits overlap. Comparisons of CLAES aerosol data with theoretical Mie calculations, based upon *in situ* particle size measurements at Laramie, WY, are presented. CLAES aerosol data are also compared to scaled aerosol extinction measured by the Stratospheric Aerosol and Gas Experiment (SAGE II) and Atmospheric Trace Molecule Spectroscopy (ATMOS) experiments. Observed and calculated extinction spectra, from CLAES, Improved Stratospheric and Mesospheric Sounder (ISAMS), and Halogen Occultation Experiment (HALOE) data, are compared. CLAES extinction data have precisions between 10 and 25%, instrumental biases near 30%, and accuracies between 33 and 43%. Latitudes for these data extended from 32°S to 80°N and from 32°N to 80°S. (Auth. mod.)

I-56156

Dudhia, A., Livesey, N., **Validation of temperature measurements from the improved stratospheric and mesospheric sounder,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9795-9809, 25 refs.

Atmospheric temperature measurements from the improved stratospheric and mesospheric sounder (ISAMS) are evaluated. Flown on the UARS, ISAMS obtained 180 days of science data between Sep. 26, 1991 and July 29, 1992. Typically, over 2600 temperature profiles/day were retrieved, spaced every 200 km along the limb-viewing track and nominally extending from 100 to 0.01 mbar (15-80 km). The latitude coverage ranged from 80°S to 80°N, depending on the particular ISAMS/UARS viewing geometry on any day. UARS is in a near-Sun-synchronous orbit, so that while the 15 orbits/d are spaced approximately every 24° longitude around the equator, the sampled local solar time actually changes by 20 min/d. The ISAMS temperature retrieval process is outlined and the various products are described. A detailed error budget for the retrieval is presented and comparisons are made with temperature measurements from other sources. Finally, a table is provided summarizing the best estimates of ISAMS temperature bias and precision. The results suggest a general cold bias of around 1 K in the stratospheric temperatures, with a superimposed 2-3 K warm bias associated with the densest part of the Pinatubo aerosol cloud. The precision of individual profiles is ±2 K throughout the stratosphere but falls off in the mesosphere to about ±10 K at 80 km. The error bars produced by the retrieval appear to be reasonable (although slightly pessimistic) estimates of the precision. (Auth.)

I-56176

Popov, A.M., Popovicheva, O.B., Rakhimova, T.V., Feoktistov, V.A., **Interaction of HCl molecules with ice under conditions modeling the polar stratosphere,** *Russian journal of physical chemistry,* 1995, 69(11), p.1823-1828, Translated from Zhurnal fizicheskoĭ khimiĭ. 16 refs.

Interaction of HCl with ice, imitating the surface of particles of polar stratospheric clouds, was investigated under laboratory conditions. A surface-diffusion model describing the surface processes and HCl dissolving in the bulk of the ice was constructed. On the basis of analysis of the experimental results obtained under static conditions, the constants of the reaction were obtained: coefficient of adhesion, frequency of desorption, and coefficient of HCl diffusion in the ice. The dynamics of interaction of HCl molecules in the flow reactor was described in terms of a model for adsorption-wave propagation. The behavior of the desorption spectrum and the independence of the amount of the desorbed HCl on the thickness of the ice were elucidated. Possible causes of discrepancy between the experimental findings of different research groups were considered.

I-56194

Wu, X., Simmonds, I., Budd, W.F., **Southern hemisphere climate system recovery from 'instantaneous' sea-ice removal,** *Royal Meteorological Society. Quarterly journal A,* Oct. 1996, 122(535), p.1501-1520, 48 refs.

A coupled atmosphere-sea-ice model has been used to investigate the temporal response to instantaneous antarctic sea-ice removal under the present extemal climate conditions. Here the authors examine the timescale and nature of the ice and atmospheric relaxation back to 'control' conditions. Several experiments were carried out, either supposing that all the sea ice was removed at certain times of year, or that it was removed only over certain large areas. For the 'whole sea-ice removal' experiment the maximum impact was found to occur when the removal was made at the time of sea-ice maximum (Sep.) and least reaction near the minimum. In both cases the retum to normal occurred by the middle of the following winter. The atmospheric responses comprised reduced difference between precipitation and evaporation over the ocean and increased over the antarctic continent. The air temperature changes spread through the troposphere and tended to reduce the circumpolar westerlies north of and over the sea-ice zone. The reaction to the regional sea-ice removals was more local and depended on where the region was located relative to the mean circulation pattem around and over Antarctica. (Auth. mod.)

I-56207

Tett, S.F.B., Mitchell, J.F.B., Parker, D.E., Allen, M.R., **Human influence on the atmospheric vertical temperature structure:**

detection and observation, *Science,* Nov. 15, 1996, 274(5290), p.1170-1173, 24 refs.

Recent work suggests a discemible human influence on climate. This finding is supported, with less restrictive assumptions than those used in earlier studies, by a 1961 through 1995 data set of radiosonde observations and by ensembles of coupled atmosphere-ocean simulations forced with changes in greenhouse gases, tropospheric sulfate aerosols, and stratospheric ozone. On balance, agreement between the simulations and observations is best for a combination of greenhouse gas, aerosol, and ozone forcing. The uncertainties remaining are due to imperfect knowledge of radiative forcing, natural climate variability, and errors in observations and model response. The range of instrumental measurements extends globally from 90°N to 90°S. (Auth. mod.)

I-56209

Hernandez, G., Forbes, J.M., Smith, R.W., Portniagin, IU.I., Booth, J.F., Makarov, N., **Simultaneous mesospheric wind measurements near South Pole by optical and meteor radar methods,** *Geophysical research letters,* May 15, 1996, 23(10), p.1079-1082, 15 refs.

Simultaneous and co-located measurements of mesospheric winds near South Pole by high-resolution optical and meteor radar methods, show similar motions at slightly different heights of observation. The observed dominant oscillations in the wind at both heights of observation are those of zonal wavenumber one character. This new information permits the earlier assignment of the nearly 10 hr oscillations as the different meridional modes of a zonal wavenumber one Lamb wave. The simultaneous absence of statistically significant kinetic temperature and optical-tracer emission rate oscillations at the frequencies corresponding to the wind motions, provides independent support to the earlier deductions on the ability of the atmosphere near the rotational poles to support only certain zonal character oscillations. (Auth. mod.)

I-56210

Nichol, S.E., Keys, J.G., Wood, S.W., Johnston, P.V., Bodeker, G.E., **Intercomparison of total ozone data from a Dobson spectrophotometer, TOMS, visible wavelength spectrometer, and ozonsondes,** *Geophysical research letters,* May 15, 1996, 23(10), p.1087-1090, 15 refs.

Comparisons of total column ozone measurements from three ground-based instruments (Dobson spectrophotometer, ozonesonde, and visible wavelength grating spectrometer) and the TOMS instrument are presented for the period 1991 to 1994 at Arrival Heights, McMurdo. The primary purpose of these comparisons is to investigate the accuracy of the visible spectrometer, while a second aim is to compare version 6 and version 7 TOMS satellite retrievals with the ground-based measurements. While the Dobson, TOMS and ozonesonde measurements show good agreement, there is a seasonal dependence between data from the visible wavelength spectrometer and each of the other three instruments. However, the visible spectrometer produces valuable data for the late autumn and early spring, when data are not available from the Dobson and TOMS. (Auth. mod.)

I-56211

Dibb, J.E., Whitlow, S.I., **Recent climate anomalies and their impact on snow chemistry at South Pole, 1987-1994,** *Geophysical research letters,* May 15, 1996, 23(10), p.1115-1118, 14 refs.

Three 2 m deep snowpits sampled at South Pole in 1994 provide detailed (2 cm resolution) profiles of the concentrations of soluble ionic species for the period 1987-1994. The most prominent feature is a large concentration spike of $SO_4^=$ in snow deposited in 1992 reflecting fallout from the eruptions of Pinatubo and Hudson in 1991. The overlapping effects of the volcanic eruptions and El Nino circulation preclude partitioning the enhanced deposition of $SO_4^=$ into volcanic and biogenic fractions. Nitrate concentration profiles show no relation to the severity of O_3 depletion in the antarctic stratosphere during the period of record. Rather, the profiles show a progressive decline of the annual peak concentrations over the top 0.5-1.0 m of each pit. This behavior is attributed to post-deposition loss of NO_3^-, presumably by re-emission of HNO_3 into the atmosphere. (Auth. mod.)

I-56212

Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995, **Preprints,** Boston, American Meteorological Society, 1995, 279p. + joint papers, WDCA 95000250, Refs. passim. For individual papers see 51-1161 through 51-1237 or F-56217 through F-56219, F-56227, F-56239, I-56213 through I-56216, I-56220 through I-56226, I-56228, I-56230 through I-56238, I-56240 through I-56246 and J-56229.

This preprint volume contains the papers accepted for presentation at the 4th Conference on Polar Meteorology and Oceanography held in Dallas, TX, Jan. 15-20, 1995. The conference brought together scientists from a variety of specializations in the atmospheric and oceanic sciences, with a common interest in the phenomena and processes that occur in high latitudes. The papers deal with all topics of interest in polar meteorology and oceanography, with special emphases on polar clouds and on climate change in the polar regions. These emphases were motivated by recent climate model results that highlight the polar regions as particularly sensitive to climate change, while at the same time the polar climate is particularly difficult to model and to remotely sense from satellite.

I-56213

Anderson, J., Saxena, V.K., **Sedimentation and subsequent deposition of the Mt. Pinatubo aerosol over Antarctica based on SAGE II and ground truth measurements,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.4-7, 19 refs.

This study focuses on changes in the microphysical and columnar properties and the stratospheric settling of the Pinatubo aerosol in a unit column between 15-25 km in the antarctic region. The temporal periods of this study are during the austral springs and summers between 1991-94 derived from the Stratospheric Aerosol and Gas Experiment (SAGE) II remotely sensed measurements. Ground truth measurements in the form of chemical analysis of a 1.8 m deep snow/ice core, collected from the Marr Ice Piedmont on Palmer Peninsula, are presently underway.

I-56214

Hogan, A.W., Bodhaine, B.A., **Twenty-year aerosol record at South Pole,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.8-12, 11 refs.

A Nolan-Pollak photoelectric nucleus counter was installed in the auroral observatory at South Pole on Jan. 26, 1974. It was moved to an interim observatory near the domed Amundsen-Scott Station in Jan. 1975, and to the clean air facility predominantly upwind of station activities in Jan. 1977. This instrument is used as an on-site standard to calibrate automatic or recording aerosol detectors, and is also used to measure the ambient aerosol concentration twice daily. This paper presents a comparison of the 20-year aerosol record with those published at five and ten years of observation. It also presents a statistical analysis of the record.

I-56215

Connolley, W.M., **Antarctic inversion,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.19-21, 4 refs.

The strongest and most persistent temperature inversion in the world occurs over the interior of Antarctica in winter. At Vostok Station the average surface inversion for the six months May to Oct. is 25°C. An accurate picture of the inversion is hard to obtain because there are few radiosonde stations in Antarctica. By using the full output from the UK Meteorological Office Global Climate Model, the author can obtain a complete map of the (model) inversion, surface and upper-air temperatures and can therefore test empirical relations between these variables. A restricted set of output, surface temperature only, is then used to generate maps of the inversion using the P&Z and regression methods, which he compares to the model inversion. He shows that both methods describe the modelled inversion strength quite well, with a standard deviation of error over the continent of about 2.5°C.

I-56216

Mahesh, A., Warren, S.G., Walden, V.P., Hughes, K., Koney, R., **Radiosonde temperature profiles at South Pole: correction for thermal lag,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.22-23, 3 refs.

Very steep shallow temperature inversions occur during most of the year on the Antarctic Plateau. The radiosonde carried by a balloon rising at 4-5 m/s does not measure the inversion-layer temperatures accurately because the response time of its thermistor is several seconds. To quantify this error, the authors flew a radiosonde on a tethered kite at the Amundsen-Scott Station on 9 occasions in Aug. and Sep. of 1992, immediately prior to the routine launch of the same sonde on a balloon. A figure shows that the temperature difference between the kite and the balloon data is several degrees in the steep inversion layer, but then diminishes as the temperature changes more slowly, allowing the thermistor to respond adequately. Owing to the finite response time of the thermistor, the temperature reported by the radiosonde at a given altitude is a linear combination of the true atmospheric temperature at that and all previous heights.

I-56220

Claffey, K.J., Andreas, E.L., Makshtas, A.P., Ivanov, B.V., **In situ measurements of the surface temperature in the western Weddell Sea,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.86-90, 8 refs.

On Ice Station Weddell (ISW) in 1992, the authors had the opportunity to compare typical Russian and American instruments used to measure the components of the radiation balance *in situ* over sea ice. Here, they focus especially on the emitted longwave flux, since this yields the surface temperature. The surface temperature, in turn, is one of the most important parameters of sea ice because it is remotely monitorable and because it is intimately related to the surface heat budget. The longwave flux and both the turbulent sensible and latent heat fluxes depend strongly on surface temperature. From the time series of ISW radiation components and surface temperatures, the authors use a new variation of the Bowen ratio method to estimate the time series of sensible and latent heat fluxes on ISW.

I-56221

Stearns, C.R., Weidner, G.A., Holmes, R., **U.S. automatic weather station program in Antarctica and Greenland,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.100-102, 1 ref.

The National Science Foundation Office of Polar Programs automatic weather station project places automatic weather station (AWS) units in remote areas of Antarctica and Greenland in support of meteorological research and operations. Tables showing polar AWS locations for 1994, and AWS sites planned for installation in 1994-95 are presented. The Development of low power computer components in the 1970s and the ARGOS DCS on the NOAA series of polar orbiting satellites made possible the development of low-power AWS units capable of operating in the extreme polar climates.

I-56222

Scharfen, G.R., Knowles, K.W., Bauer, R.J., Swick, R.S., **Polar data sets from the Defense Meteorological Satellite Program (DMSP) digital data archive,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.103-107, 16 refs.

The U.S. Air Force operates the Defense Meteorological Satellite Program (DMSP), a system of near-polar-orbiting satellites designed for use in operational weather forecasting and other applications. DMSP satellites carry a suite of sensors that provides images of the earth and vertical profiles of the atmosphere. These include the Operational Linescan System (OLS) visible and infrared imager, the Special Sensor Microwave Imager (SSM/I), SSM/T temperature profiler, and SSM/T-2 water vapor profiler, which are described. The National Snow and Ice Data Center (NSIDC) will provide user services for DMSP data to the cryospheric/polar research community. This paper describes the data sets available through NSIDC and applications of these data for cryospheric/polar research. The status of the archive and user services are described. Examples of data are illustrated.

I-56223

Stearns, C.R., Young, J.T., **Antarctic Meteorological Research Center at the University of Wisconsin and McMurdo, Antarctica,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.108.

The functions of the Antarctic Meteorological Research Center (AMRC) are: to collect, process, archive, and display all possible satellite and ground based meteorological data at McMurdo Station for research applications; to collect all useful and available synoptic meteorology products from sources other than Antarctica, such as the synoptic outputs of the Australian Bureau of Meteorology and the University of Wisconsin; and to distribute the antarctic meteorological data to all interested parties over Internet in McIDAS format (at the present time).

I-56224

Cassano, J.J., Stearns, C.R., **Evaluation of a method for estimating the surface temperature inversion strength on the south polar plateau using slope flow theory,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.109-111, 5 refs.

Persistent katabatic winds over the gentle ice slopes in the interior of Antarctica have previously been modeled using slope flow theory, given a terrain slope, fall line direction, and an estimate of the temperature inversion strength. The goal of this project was to evaluate a method which would allow an estimate of the surface inversion strength using automatic weather station (AWS) data and a slope flow theory. These katabatic winds are driven by a sloped inversion pressure gradient force. The sloped inversion pressure gradient force arises from horizontal differences in the air temperature due to the presence of a temperature inversion over sloping terrain, shown in a figure.

I-56225

Stearns, C.R., Young, J.T., Sinkula, B., **Two years of IR images south of 40 deg S every three hours,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.112.

Composite satellite images in the 11.5 to 12.5 mm band are formed at three hourly intervals ±50 minutes using the geostationary satellites GOES-7, 112°W; GMS, 140°E; Meteosat-3, 0°; Meteosat 4, 60°W and polar orbiting satellites NOAA 11 and 12. The final image is one megabyte in size and the resolution is 10 km. The images are stored on optical disks. The geostationary satellites are entered into the composite image first and the polar orbiting satellites overwrite the geostationary satellites. The image extends from the South Pole to approximately 34°S.

I-56226

Turner, J., Colwell, S.R., **Temporal variability of precipitation over the western Antarctic Peninsula,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.113-116, 5 refs.

The authors examine the variation of precipitation over the western side of the Antarctic Peninsula through an investigation of the long series of surface synoptic reports made at Faraday Station. The variability of precipitation throughout the year is considered along with changes observed since the 1950s. The variability observed is related to changes noted in other surface meteorological observations from Faraday, the sea ice extent and the broader scale atmospheric circulation changes determined from the series of surface analyses prepared by the Australian Bureau of Meteorology.

I-56228

Goodrick, S., England, D., McNider, R.T., **Modeling of the cou-**

pled katabatic/ocean and ice systems of the Antarctic, Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.174-179, 26 refs.

It is the purpose of this paper to begin a model study of the interaction of antarctic katabatic flow with the coastal ocean. A coupled ocean atmosphere model is developed and simple experiments are carried out to elucidate the impact of the katabatic flows on transport and upwelling dynamics of the coastal ocean and examine the fidelity of the numerical model.

I-56230

Hines, K.M., Bromwich, D.H., **Simulated antarctic mesoscale processes and climate,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.228-233, 15 refs.

In this paper, the authors examine the meteorology of high southern latitudes simulated by a high-resolution mesoscale model, a version of the Penn State/National Center for Atmospheric Research Mesoscale Model, version 4 (PSU/NCAR MM4). The mesoscale model can be run independently with intitial and boundary conditions obtained from analyses by the European Centre for Medium-Range Weather Forecasts (ECMWF) or be nested within the NCAR Community Climate Model version 2 (CCM2). The focus of this paper is a preliminary assessment of a nested simulation of climate during the austral winter.

I-56231

Bromwich, D.H., Carrasco, J.F., **Investigation of an intense mesoscale cyclone over southern Marie Byrd Land, West Antarctica,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.238-243, 17 refs.

Observational studies of mesoscale cyclones over the high southern latitudes have demonstrated the large activity of these perturbations over the antarctic coastal areas as well as the surrounding sea-ice zone. A recent study of mesoscale cyclones, based on the examination of one year of satellite imagery, showed that a significant number of mesoscale vortices observed over the Ross Ice Shelf came from Marie Byrd Land, West Antarctica, suggesting that this region is another cyclo-genetic area. On Nov. 11-12, 1992, the Polar Meteorology Group from the Byrd Polar Research Center encountered a strong mesoscale cyclone over southern Marie Byrd Land. Here, the authors present an analysis of this event.

I-56232

Rockey, C.C., Braaten, D.A., **Characterization of polar cyclonic activity and relationship to observed snowfall events at McMurdo Station, Antarctica,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.244-245, 3 refs.

Throughout the year, coastal margins of Antarctica are frequently influenced by episodic snowfall events which produce trace amounts of snow, but only occasionally by snowfall events which produce measurable amounts. Previous investigations have not considered precipitation in characterization of antarctic cyclones, and the primary objective in this study is to link point precipitation measurements to cyclone characteristics and source region. Infrared satellite images, from Jan. 25 through July 31, 1994, have been used to identify, classify and track meso- and synoptic scale lows around Antarctica, and snowfall observations from McMurdo Station for this same period have been obtained and are discussed.

I-56233

Smith, S.R., Bromwich, D.H., Chen, B., **Split jet evolution over the South Pacific Ocean during the 1986-1989 ENSO cycle,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.246-251, 24 refs.

The El Niño/Southern Oscillation (ENSO) has long been recognized as the major climate variation of the tropical South Pacific Ocean. The primary obstacle to linking Antarctica to ENSO is finding a dynamic north/south connection. Using hemispheric analyses, the authors established that dramatic changes in the split jet stream occur in the South Pacific sector (180° to 120°W). They present hypotheses consistent with the data results and the current knowledge of Southern Hemisphere dynamics to investigate the meridional circulation from the tropics to the South Pole during the 1986-89 ENSO cycle.

I-56234

Andreas, E.L., Claffey, K.J., Makshtas, A.P., **Low-level atmospheric jets over the western Weddell Sea,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.252-257, 15 refs.

A common theme in the literature is that the polar regions are ideal "laboratories" for studying atmospheric processes. The authors reiterate that theme and demonstrate it with a study of the stable atmospheric boundary layer (ABL) on Ice Station Weddell (ISW). Understanding of the stable boundary layer lags behind that of the convective boundary layer because, in more temperate latitudes, stable boundary layers are strictly nighttime phenomena and, thus, are rarely in steady state. On ISW, however, over 96% of the radiosoundings showed that the lower atmosphere was stably stratified. The authors, thus, had the opportunity to observe repeatedly, and in detail, the structure of the stable boundary layer. They found that the main feature of the stable boundary layer over the western Weddell Sea was a low-level jet. Almost 80% of the soundings revealed this jet, which frequently engulfed and battered their tethered radiosounding balloon. The authors document the characteristics of the jet and offer a mathematical explanation for its dynamics.

I-56235

Chen, B., Panetta, R.L., **Double jets in a two-level PE model,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.258-261, 15 refs.

The observational analyses have revealed that there are two jets in the Southern Hemisphere winter, a subtropical jet and a polar front jet. The meridional cross-section with height indicates that the subtropical jet has baroclinic structure whereas the polar jet shows roughly equivalent barotropic structure. Using a two-level, primitive equation, spectral model, the purpose in the present work is to find forcing which produces a polar front jet well-separated from the subtropical jet, to analyze the mechanism of formation and maintenance of two kinds of jets, and to study the interactions between the subtropical jet and polar front jet.

I-56236

Du, Y., Bromwich, D.H., Parish, T.R., **Modeling katabatic winds over West Antarctica,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.262-267, 9 refs.

Katabatic winds, which are driven by strong radiative cooling of the sloping ice surface, are a common climatic feature of the lower atmosphere over the continent of Antarctica, especially along the periphery. This strong wind has great impact on the behavior of the atmospheric boundary layer and the overlying troposphere. A better understanding of the antarctic katabatic winds is important to the study of atmospheric processes in high southern latitudes. This paper summarizes results from investigations of the surface wind regime over West Antarctica with a three dimensional mesoscale numerical model and makes comparisons with available observational data.

I-56237

Bromwich, D.H., Liu, Z., **Observational study of the springtime Siple Coast confluence zone,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.272-277, 12 refs.

The summer streamline simulation by Parish and Bromwich (1986) shows that there should be a confluence zone (where drainage flows converge) in the Siple Coast area. Analysis from the 1984-85 and 1985-86 austral summer observations taken at three temporary camps confirms the existence of the Siple Coast confluence zone. To improve the understanding of the katabatic wind regime, the 1992 field program was undertaken. Based upon the model results and previous surface observations, two sites (Upstream B and South Camp) for the campaign were chosen in the confluence zone near Siple Coast. An extensive observational network was established in order to study the confluence zone structure in both lateral and vertical directions. Results are discussed and illustrated.

I-56238

Manabe, S., Stouffer, R.J., Spelman, M.J., **Interaction between polar climate and global warming,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/1-J9/9, 25 refs. Joint paper with 6th Symposium on Global Change Studies.

This paper describes the response of a coupled ocean-atmosphere-land surface model, developed at the Geophysical Fluid Dynamics Laboratory, to increasing atmospheric CO_2. It includes a summary of the results in three published papers (Stouffer et al., 1989; Manabe et al., 1991, 1992). In addition, results from recent investigations (Manabe and Stouffer, 1993, 1994) are discussed, exploring the multiple-century response of the coupled model to a doubling and quadrupling of atmospheric CO_2.

I-56240

Bromwich, D.H., Chen, B., Pan, X.G., **Intercomparison of simulated polar climates by global climate models,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/14-J9/19, 20 refs. Joint paper with 6th Symposium on Global Change Studies.

Intercomparisons are performed of simulated arctic and antarctic climate for 1979-1988 by 17 currently available international climate models. The accuracy of modeled sea-level pressure depends on horizontal resolution. It seems that a critical resolution exists at about 4°x4°, i.e., simulated results are significantly improved when the model resolution is better than the critical resolution. There is a maximum discrepancy in simulated precipitation over the Arctic and Antarctica. It is suggested that the cause of the excess simulated precipitation in high latitudes must be factors other than moisture availability, most likely the simulated general circulations of the respective models. Most of the models are able to capture the evaporation/sublimation rate quite well over the polar regions. Thus the large errors in the net precipitation over high latitudes are thought to be caused by the anomalously large simulated precipitation rates.

I-56241

Brune, W.H., **Chemical evolution of the polar stratosphere: a status report,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J9/28-J9/29, 6 refs. Joint paper with 6th Symposium on Global Change Studies.

The chemical processes involved in the rapid ozone loss in polar regions are described. The following issues are examined: the cause of year-to-year variability in ozone loss observed at the poles, the details of the microphysics and chemistry of sulphate aerosols and polar stratospheric clouds, the relative importance of export of polar vortex air, and the interactions among the chemical families and the possibility that additional chemistry is occurring unobserved.

I-56242

Rossow, W.B., **Another look at the seasonal variation of polar cloudiness with satellite and surface observations,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J10/1-J10/4, 16 refs. Joint paper with Conference on Cloud Physics.

The polar regions exhibit completely different energy balances, where solar heating is less important than atmospheric heat transport and clouds reverse their lower latitude roles to heat the surface and cool the atmosphere. However, the annual mean energy balance and the roles played by the atmosphere, ocean, and clouds are composed of complicated seasonal variations. Extreme conditions have inhibited collection of adequate observations to diagnose these variations. This paper is a progress report on continuing refinements of the analyses of available measurements of clouds.

I-56243

Warren, S.G., Hahn, C.J., London, J., **Seasonal cycle of cloud cover at the poles, from surface observations screened by a moonlight criterion,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J10/11, 4 refs. Joint paper with Conference on Cloud Physics.

At Amundsen-Scott Station, the average reported cloud cover is about 58% in summer and 37% in winter. Nighttime (winter) cloud observations on the Antarctic Plateau present special difficulties: the typically thin clouds may cause no more dimming of the stars than does heavy diamond-dust; moonlit clouds may be confused with aurora, which is usually colorless and occurs on most days; and obscuration of the sky due to blowing snow can occur nearly one-third of the time in winter and is probably correlated with cloud cover.

I-56244

Song, N.H., **Freezing temperatures of $H_2SO_4/HNO_3/H_2O$ mixtures: implications for PSC initiation,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J11/1-J11/2, 2 refs. Joint paper with Conference on Cloud Physics.

Some $H_2SO_4/HNO_3/H_2O$ mixtures freeze readily under conditions applicable to the stratosphere. Variables that control the freezing are not fully identified, but how they affect PSC initiation is well known. The objective of the current study is to measure freezing temperatures of the temary mixture over a broad composition range and to apply the data to the understanding of PSC initiation.

I-56245

Saxena, V.K., **Production of cloud condensation nuclei (CCN) by dissipating clouds at Palmer Station, Antarctica: a natural anti-greenhouse mechanism,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.J11/3-J11/6, 31 refs. Joint paper with Conference on Cloud Physics.

The processes that could enhance CCN concentration in marine environment are of prime importance from the standpoint of climate change. The purpose of this paper is to report the ground based observations of CCN enhancement at Palmer Station recorded during Jan.-Feb. 1994, using the Fukuta-Saxena CCN Spectrometer. Further analysis of CCN bursts reported here is underway and the field observations are scheduled to be repeated in austral spring/summer 1995.

I-56272

Marshall, W.A., **Biological particles over Antarctica,** *Nature,* Oct. 24, 1996, 383(6602), p.680, 14 refs.

A brief account is given of a massive increase of airborne biological particles at the South Orkney Islands. The event occurred during a 26-hour period on 11/12 Nov. 1993 under the influence of a strong cyclonic circulation around a low pressure center SW of Tierra del Fuego. This circulation produced an increase of collected airbome biological particles 24, 17, and 13 times greater than the mean for all samples collected at each of three sites on Signy Island. A reduced copy of the daily synoptic weather chart of Nov. 11, 1993 showing the weather pattem which generated this transport is included.

I-56307

Kondrat'ev, K.IA., Johannessen, O.M., Ṁelent'ev, V.V., **High latitude climate and remote sensing,** Wiley-Praxis series in remote sensing, Chichester, England, John Wiley & Sons Ltd., 1996, 200p., Refs. p.168-194.

DLC QC994.75.K67 1996

This book discusses the monitoring of global warming by passive and active satellite remote sensing of the atmosphere, ocean, ice, and snow at high latitudes in the microwave range. The emphasis is on global, Northern Hemisphere, or arctic processes, but numerous comparisons with the Antarctic are cited, with particular interest in the antarctic ozone hole, aerosols, and heat balance. The pertinence to the Antarctic is also frequently implied where not explicit.

I-56312

Hahne, A., **Ozone saga, the GOME experiment and the Nobel story...,** *Earth observation quarterly,* Mar. 1996, No.51, p.1-5, 10 refs.

The first results provided by the GOME (Global Ozone Monitoring Experiment) aboard ESA's remote-sensing satellite ERS-2 including the ozone content over Antarctica, are discussed. The atmosphere surrounding the Earth contains small quantities of ozone, a gas with molecules consisting of three oxygen atoms (O3). If all the ozone of the atmosphere were compressed to a pressure corresponding to that at the Earth's surface, the layer would be only 3 mm thick. But even though ozone occurs in such small quantities, it plays an exceptionally fundamental part in life on Earth. This is because ozone, together with ordinary molecular oxygen, is able to absorb the major part of the Sun's UV radiation and therefore prevents this dangerous radiation from reaching the surface. Without a protective ozone layer in the atmosphere, animals and plants could not exist, at least on land. (Auth. mod.)

I-56317

Pearce, F., **Frozen clouds accelerate ozone destruction,** *New scientist,* Oct. 12, 1996, 152(2051), p.6.

Ozone concentrations over Antarctica were plunging towards record lows the week of Oct. 12, 1996 as the ozone hole spread across the continent. At the British Halley base, readings fell to 109 Dobson Units, compared to a pre-hole average of 300 DU. "This is close to the record low of 101 DU in 1994," says the British Antarctic Survey's chief data collector, Jon Shanklin. (Auth. mod.)

I-56321

Mikhnevski, N., Velchev, K., **Some results of aerosol measurements carried out during the 33rd Soviet Antarctic Expedition,** *Bulgarska akademiia na naukite, Sofia. Doklady,* 1990, 43(2), p.25-28, 7 refs.

DLC Q69.B93 1990

Aerosol measurements were carried out on board the *Mikhail Somov* research vessel by members of the 33rd Soviet Antarctic Expedition from Feb. 11 to June 11, 1988. An AZ-5 photoelectric aerosol counter manufactured in the USSR was used. The operation range of the device was from 0.4 μm to 10 μm. Two hundred and five aerosol distributions were obtained during an almost meridional course in the Atlantic Ocean and along the antarctic coast, from 75°W to 13°E longitude; and 23 were obtained at 80 km inside the continent in the region of Novolazarevskaya Station. The measurements in the ocean were carried out 15 m above the sea surface. In this paper, the authors answer some general questions concerning the characteristics of sea- and continental aerosols based on the data obtained.

I-56332

Hofmann, D.J., **Recovery of antarctic ozone hole,** *Nature,* Nov. 21, 1996, 384(6606), p.222-223, 8 refs.

An assessment is made of the recovery of ozone over Antarctica from Jan. 1996 to Nov. 1996, along with a projection of the trend into the mid-21st century. It is expected that detection of a healing of ozone depletion should occur early in the next century. A brief review is given of the ozone measuring program which resulted from the ban of CFCs and halogens as required by the Montreal Protocol. At the present rate and barring future non-compliance with the M/P, the total ozone destroying potential in the atmosphere will peak in the stratosphere between 1997 and 1999, the ozone layer will begin to heal slowly, and will reach pre-ozone-hole levels by about 2050.

I-56333

Epstein, J.H., **Potential cutaneous effects of stratospheric ozone depletion,** *Environmental reviews,* 1996, 4(1), p.1-7, With French summary. Refs. p.5-7.

Recent evidence indicates that there has been a reduction in the stratospheric ozone over the Northern Hemisphere, as well as the antarctic and arctic latitudes. This has resulted in an increased penetration of ultraviolet B (UVB), as measured in Canada since 1989, which could eventually result in an increase in human skin cancer incidence. This would be especially true for the nonmelanoma skin cancers (NMSCs), basal cell carcinomas and squamous cell carcinomas. In addition, the third most common skin cancer, the malignant melanoma, would also increase in incidence. The relationship between UVB radiation and melanoma formation is much less clear than it is for NMSCs. Clinically, people with a loss or lack of melanin protection, such as those with occulocutaneous albinism and vitiligo or, much commonly, people with light skin, eyes, and hair would be at greater risk. (Auth. mod.)

I-56337

Liu, Z., **Atmospheric boundary layer dynamics near Ross Island and over West Antarctica,** Columbus, Ohio State University, 1995, 304p., University Microfilms order No.96-12231, Ph.D. thesis. Refs. passim.

The atmospheric boundary layer dynamics near Ross I. and over West Antarctica has been investigated. The study consists of two parts. The observational analysis, for the first time, revealed that the airflow passing through the Ross I. area is supplied mainly by enhanced katabatic drainage from Byrd Glacier and secondarily drainage from Mulock and Skelton glaciers. The observed diurnal variation of the blocking effect near Ross I. is dominated by the changes in the upstream katabatic airflow. The synthesized analysis over West Antarctica found that the Siple Coast katabatic wind confluence zone consists of two superimposed katabatic airflows: a relatively warm and more buoyant katabatic flow from West Antarctica overlies a colder and less buoyant katabatic airflow from East Antarctica. The force balance analysis revealed that, inside the west antarctic katabatic wind zone, the pressure gradient force associated with the blocked airflow against the Transantarctic Mountains dominates; inside the east antarctic katabatic wind zone, the downslope buoyancy force due to the cold air overlying the sloping terrain is dominant. The analysis also shows that these forces are in geostrophic balance with the Coriolis force. (Auth. mod.)

See also:

A-55506 A-55887 A-55888 A-55889 A-56149 B-54155 B-54238
B-54241 B-54256 B-54268 B-54389 B-54440 B-54555 B-54659
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B-54839 B-54841 B-54842 B-54843 B-54904 B-55010 B-55047
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K-56167 K-56168 K-56169 K-56170 K-56273

J. OCEANOGRAPHY

J-54053

Kumar, N., et al, **Increased biological productivity and export production in the glacial southern ocean,** *Nature,* Dec. 14, 1995, 378(6558), p.675-680, 56 refs.

A range of complementary radionuclide proxies in sediments of the southernmost Atlantic Ocean over the past 140,000 years indicate that glacial periods were characterized by greatly increased fluxes of biogenic detritus out of surface waters. This increase in export production, which may have contributed to lower concentrations of carbon dioxide in the glacial atmosphere, was accompanied by more than a fivefold increase in accumulation of lithogenic iron transported by winds from Patagonian deserts. These observations support the hypothesis that the iron limitation of today's southern ocean productivity was relieved in glacial periods by a greater supply of iron from wind-blown dust. (Auth.)

J-54115

Niemistö, L., Perttilä, M., **Trace elements in the Weddell Sea water and sediments in the continental shelf area,** *Chemosphere,* Oct. 1995, 31(7), p.3643-3650, 17 refs.

During the Finnish antarctic cruise FINNARP89, a relatively rapid sedimentation area was found at the edge of the continental shelf in the vicinity of the ice edge. The average rate of sedimentation in the topmost sediment surface, measured by means of ^{210}Pb technique, was 0.2 mm/y, an order of magnitude higher than in the open Weddell Sea area. (Auth.)

J-54130

Häkkinen, S., **Seasonal simulation of the southern ocean coupled ice-ocean system,** *Journal of geophysical research,* Nov. 15, 1995, 100(C11), p.22,733-22,748, 58 refs.

The southern ocean ice-ocean system is investigated using a coupled model developed at Princeton University. The ocean model uses the primitive equations and solves the second-moment closure for turbulent mixing; the snow-ice model uses a three-level thermodynamic scheme resembling Semtner's (1976) model. The focus here is to study the seasonal variability of the ice covered areas and water mass formation. The model simulates reasonably well the seasonal cycle of the ice cover in the southern ocean. The annual rapid advance of the ice extent is tied to the ice advection away from the coast toward the Antarctic Circumpolar Current (ACC), where it melts rapidly with the increase of radiative fluxes in the austral spring. The oceanic heat fluxes are up to 100 W/m^2 in open water areas and along the coastal areas except in the Weddell and Ross Seas, which are occupied by a year-round sea ice cover and have average heat flux of 20 W/m^2 or less. The Atlantic meridional heat flux is zero at 34°S (northern boundary of the model), which is an inadequancy in the model. In the Indian Ocean sector the flux is southward, while in the Pacific sector it is weak and equatorward. From the water mass balance the authors deduce that the Antarctic Bottom Water (AABW) annual production is 12 Sv in the Atlantic sector and 5 Sv in the Ross Sea. Intermediate water types are produced in the Indian Ocean sector, where some of the AABW is lost during that conversion. In the Atlantic sector, 6 Sv of the annually formed AABW is advected north across the ACC. In the Pacific sector the northward AABW flow is 7.5 Sv, which is in excess of the Ross Sea production, suggesting that a considerable portion of the AABW formed in the Weddell Sea is contributing to that flux. (Auth. mod.)

J-54153

Foster, T.D., **Large, steplike temperature and salinity structures observed in the central Weddell Sea,** *Antarctic journal of the United States,* 1994, 29(5), p.99-100, 1 ref.

As part of a project to study the formation of Antarctic Bottom Water in the Weddell Sea, three oceanographic expeditions have been carried out in the northwestern sector of the Weddell Sea. On each of these expeditions, time series were carried out of CTD (conductivity-temperature-depth) stations to investigate the very large, up to about 500 m thick, steplike structures in the temperature and salinity vertical profiles observed in the central regions of the Weddell Sea since 1973. The 1991 time series showed that internal waves with approximately semidiurnal frequency (that is, internal tides) move the principal interfaces up and down to different pressure levels. The pressure changes at the largest interface by about 80 decibars, and thus may trigger an instability due to the pressure effect on the equation of state.

J-54154

Kieber, D.J., **Photochemistry of antarctic waters during the 1993 austral spring,** *Antarctic journal of the United States,* 1994, 29(5), p.100-102, 7 refs.

A laboratory and field study to examine the photochemistry of antarctic waters in response to changing UV-B fluxes was carried out during an oceanographic cruise aboard the R/V *Nathaniel B. Palmer* from Oct. 10 to Nov. 10, 1993, occupying several stations in the confluence of the Scotia and Weddell Sea. The initial results of this research are reported.

J-54156

Nittrouer, C.A., Jaeger, J.M., DeMaster, D.J., **Advection of suspended sediment in the Ross Sea and implications for the fate of biogeochemical materials,** *Antarctic journal of the United States,* 1994, 29(5), p.106-107, 3 refs.

As part of a multidisciplinary study to investigate the fate of biogeochemical materials (biogenic silica, carbon, and nitrogen), the validity of one-dimensional particle sinking models has been investigated. Measurements of biological uptake were made in surface waters, particles sinking vertically were collected in sediment traps, and the particles reaching the seabed were sampled by coring. Quantitative and qualitative differences between the material collected at the various locations have been used to evaluate the processes affecting its fate. A particular concern has been that productivity in surface waters may have little relevance to material at depth in the water column or seabed, due to lateral advection by currents. To investigate particle advection, instrumented moorings were placed at 3 sites in the Ross Sea, and they collected data for 1 year periods during 2 consecutive years (1990-92). To test the validity of one-dimensional particle sinking, a computer model was developed using moored current-meter data and particle-settling velocities. The results of the model strongly reflect the varying water velocities at the 3 moorings.

J-54157

Jacobs, S.S., Hellmer, H.H., Schlosser, P., Smethie, W.M., Jr., **Oceanographic expedition to the Amundsen and Bellingshausen Seas,** *Antarctic journal of the United States,* 1994, 29(5), p.109-111, 16 refs.

The icebreaker *Nathaniel B. Palmer* was engaged from Feb. 14 to Apr. 5, 1994 to conduct an oceanographic investigation along the southeast Pacific-Antarctic continental margin. The National Science Foundation and other agencies supported several projects that complemented the primary ocean measurements. These included geochemical sampling for carbon dioxide, chlorofluorocarbons (CFCs), helium isotopes, oxygen isotopes, tritium, and nutrients. Preliminary results reveal that the Amundsen and Bellingshausen Sea shelves are remarkably different from similarly broad shelf regions in the Ross and Weddell Seas. The local bottom topography differs widely from that shown on currently available charts; canyons or depressions often extend to or along the coastline. The authors encountered large numbers of icebergs, similarly to 1992 observations along the antarctic circle in this sector.

J-54159

Rubin, S., Goddard, J., Chipman, D., Takahashi, T., **Carbon dioxide partial pressure in surface waters in the Pacific sector of the southern oceans during austral summers 1992 and 1994,** *Antarctic journal of the United States,* 1994, 29(5), p.113-115, 5 refs.

In Feb. and Mar. of 1992 and 1994, the partial pressure of carbon dioxide (pCO_2) and concentration of total carbon dioxide (TCO_2) dissolved in sea water were determined for surface and deep waters along two cruise tracks in the Pacific sector of the southern ocean. These expeditions included sections across the continental shelf areas of the Bellingshausen and Amundsen Seas. Results show that the Pacific sector of the southern ocean south of 65°S is an atmospheric CO_2 sink.

J-54160

Hayes, J.M., McTaggart, A.R., **Sample strategy for the study of factors controlling the carbon-13 in algal and sedimentary biomarkers from the Amundsen and Bellingshausen Seas,** *Antarctic journal of the United States,* 1994, 29(5), p.116-117, 8 refs.

The purpose of this project was to study the abundances of carbon-13 (^{13}C) in suspended particulate organic matter and in phytoplankton-specific molecules and to determine which oceanographic factors most significantly control the photosynthetic fractionation of carbon isotopes. This study will provide baseline information allowing more detailed interpretation of isotopic signals in terms of specific processes and conditions in marine water columns.

J-54179

Gründlingh, M.L., **Surface wave conditions at Marion Island,** *South African journal of antarctic research,* 1994, 24(1&2), p.95-101, With Afrikaans summary. 23 refs.

The surface wave climate and wave profiles in the vicinity of Marion I. are investigated, using SWH (significant wave height) from the Geosat altimeter between 1986 and 1989. The average SWH varies between 3.2 m (summer) to 4.8 (winter) with a maximum of 9.3 m. A wave-height trough in the lee (i.e., east) of Marion amounts to 0.4 to 2.8 m below the open ocean levels. The reduction in SWH may influence the mixing characteristics in the lee of Marion. (Auth.)

J-54200

Weimerskirch, H., Wilson, R.P., Guinet, C., Koudil, M., **Use of seabirds to monitor sea-surface temperatures and to validate satellite remote-sensing measurements in the southern ocean,** *Marine ecology progress series,* Oct. 5, 1995, 126(1-3), p.299-303, 12 refs.

Changes in sea-surface temperature (SST), including the position of the sub-tropical convergence of the southern Indian Ocean, were ascertained by using wandering albatrosses *Diomedea exulans* fitted with temperature recorders and by satellite tracking systems. Flight phases interspaced with frequent pauses on the sea means that albatrosses make useful tools for studying SST in the southern ocean, because *in situ* measurements (to validate satellite data) are rare due to the remoteness of the area. Comparison of satellite-derived data with measurements using albatrosses indicates a good correlation between the two sets of data. It is suggested that albatrosses could be useful for monitoring SST and validating satellite-derived data in remote areas of the southern ocean, particularly in winter when cloud cover precludes satellite measurements of SST. (Auth.)

J-54236

Wells, N.C., de Cuevas, B.A., **Depth-integrated vorticity budget of the southern ocean from a general circulation model,** *Journal of physical oceanography,* Nov. 1995, 25(11)pt.I, p.2569-2582, 24 refs.

An analysis of the depth-integrated vorticity budget of the U.K. Fine Resolution Antarctic Model is used to investigate the mechanisms that maintain and dissipate vorticity in the Antarctic Circumpolar Current (ACC) and adjacent circulations of the southern ocean. The individual contributions to the vorticity budget are evaluated over the last six years when the model had reached a quasi-steady state. It is shown that the primary balance in the ACC is between the curl of the wind stress and the bottom pressure torque (BPT). Regional analysis reveals that the predominant contribution to BPT is from the Drake Passage, Scotia Sea, and the Argentine Basin. The region to the south of Tasmania and New Zealand also contributes significantly to BPT in the ACC. In addition it is shown that Drake Passage and the Falkland Current are responsible for the major dissipation of the ACC. Within the ACC between 320° and 290°E there is good correspondence between the integrated southward flow and the curl of the wind stress. (Auth. mod.)

J-54239

Sildam, J., **Cruise ANTARKTIS XII/4 of RV *Polarstern* in 1995: CTD-report,** *Berichte zur Polarforschung,* 1995, No.178, 64p., 3 refs.

This report presents the results of CTD measurements carried out in the Bellingshausen Sea, an area with few CTD measurements. The main part of the report consists of a brief description of the CTD data acquisition and processing routines, the vertical profiles of temperature, salinity and density, and of the distribution plots of these properties along the hydrographic sections. The final part of the report deals with the notably similar structure of the vertical density distribution at different locations when presented as a function of a non-dimensional vertical coordinate. It is pointed out that such a distribution could be an asymptotic limit of stationary mixing along neutral surfaces.

J-54254

Hoppema, M., Fahrbach, E., Schröder, M., Wisotzki, A., De Baar, H.J.W., **Winter-summer differences of carbon dioxide and oxygen in the Weddell Sea surface layer,** *Marine chemistry,* Dec. 1995, 51(3), p.177-192, Refs. p.190-192.

Mid-winter total inorganic carbon (TCO_2) and oxygen measurements are presented for the central fully ice-covered Weddell Sea. Lateral variations of these properties in the surface layer of the central Weddell Sea were small but significant. These variations were caused by vertical transport of Warm Deep Water into the surface layer and air-sea exchange before the ice cover. Oxygen saturation in the surface layer of the central Weddell Sea was near 82%, while in the eastern shelf area it was 89%. In early summer the measurements were repeated. In the shelf area and the central Weddell Sea, where the ice cover had almost disappeared, photosynthesis had caused a decrease of pCO_2 and an increase of oxygen compared to the previous winter. Between these two regions there was an area with significant ice cover where essentially winter conditions prevailed. Based on the summer-winter difference a (late winter) entrainment rate of Warm Deep Water into the surface layer of 4-5 m/month was calculated. A complete surface water balance, including entrainment, biological activity and air-sea exchange, showed that between the winter and summer cruises CO_2 and oxygen had both been absorbed from the atmosphere. (Auth. mod.)

J-54267

Flower, B.P., Kennett, J.P., **Middle Miocene deepwater paleoceanography in the southwest Pacific: relations with East Antarctic Ice Sheet development,** *Paleoceanography,* Dec. 1995, 10(6), p.1095-1112, Refs. p.1111-1112.

A suite of middle Miocene Deep Sea Drilling Project sites in the southwest Pacific reveals large-scale changes in deepwater circulation associated with East Antarctic Ice Sheet (EAIS) variations from ca. 16.5 to 13.8 Ma. Oxygen and carbon isotopic records based on *Cibicidoides* benthic foraminifera from a depth transect and from a meridional transect allow detailed examination of southwest Pacific deepwater circulation from ca. 17.5 to 12 Ma. Data are consistent with the hypothesis that major EAIS growth was fostered by diminished meridional heat transport to the high southern latitudes related to the termination of Tethyan Indian Saline Water and an increase in Southern Component Water production during the early middle Miocene after 15.6 Ma. Further, a maximum vertical carbon isotopic gradient of 0.8 per mill at 13.6 Ma suggests that Southern Component Intermediate Water production and Pacific Deep Water strength were each at a maximum at this time and were critical to major EAIS growth. The establishment of near-modern $\delta^{13}C$ and $\delta^{18}O$ gradients following major EAIS growth from ca. 14.0 to 13.8 Ma marks a major step in the development of the Neogene ocean/cryosphere system. (Auth. mod.)

J-54271

Hellmer, H.H., Jacobs, S.S., **Temporal changes in shelf water of the southern Ross Sea,** *Antarctic journal of the United States,* 1994, 29(5), p.123-124, 4 refs.

The authors completed an 800 km transect parallel to the Ross Ice Shelf edge, on the USCGC *Polar Sea* from Feb. 4 to 10, 1994. On 42 stations, most begun less than 1 km from the ice front, conductivity-temperature-depth (CTD) measurements were made to within 10 m of the bottom. At several locations the ship drifted rapidly in the coastal current, resulting in tow-yo vertical profiles. The casts were accompanied by sampling for salinity, dissolved oxygen, total carbon dioxide (TCO_2), chlorofluorocarbons, helium, tritium, isotopic oxygen-18, and nutrients. On alternate stations water samples were obtained from the upper 150 m for two other projects. Portions of this transect repeat earlier sections along the Ross Ice Shelf edge, some taken more than 25 years ago. A comparison of preliminary results with earlier observations between 173°W and 174°W reveals that the 1994 data are cooler by approximately 0.4°C and fresher by approximately 0.06 practical salinity units (psu) in the salinity range from 34.40 to 34.55 psu.

J-54299

Frank, M., et al, **Sediment redistribution versus paleoproductivity change: Weddell Sea margin sediment stratigraphy and biogenic particle flux of the last 250,000 years deduced from $^{230}\mathrm{Th}_{ex}$, ^{10}Be and biogenic barium profiles,** *Earth and planetary science letters,* Dec. 1995, 136(3-4), p.559-573, 33 refs.

High resolution $^{230}\mathrm{Th}_{ex}$ and ^{10}Be and biogenic barium profiles were measured at three sediment gravity cores (length 605-850 cm) from the Weddell Sea continental margin. Strong variations in the radionuclide concentrations in the sediments resembling the glacial/interglacial pattern of the δ^{18}O stratigraphy and the ^{10}Be stratigraphy of high northern latitudes were used for establishing a chronostratigraphy. $^{230}\mathrm{Th}^0_{ex}$ fluxes (0 stands for initial) exceeding production by up to a factor of 4 suggest that sediment redistribution processes, linked to variations in bottom water current velocity, played the major role in controlling the radionuclide and biogenic barium deposition during isotope stages 5e and 1. The correction for sediment focusing makes the 'true' vertical paleoproductivity rates, deduced from the fluxes of proxy tracers like biogenic barium, much lower than previously estimated. Very low $^{230}\mathrm{Th}^0_{ex}$ concentrations and fluxes during isotope stage 6 were probably caused by rapid deposition of older resedimented material, delivered to the Weddell Sea continental slopes by the grounded ice shelves and by contemporaneous erosion of particles originating from the water column. (Auth. mod.)

J-54306

Onken, R., **Spreading of lower circumpolar deep water in the Atlantic Ocean,** *Journal of physical oceanography,* Dec. 1995, 25(12), p.3051-3063, 45 refs.

A Stommel-Arons model of the circulation of Lower Circumpolar Deep Water (LCDW) in the Atlantic Ocean is presented and compared with observations. The LCDW is defined as a layer of uniform thickness over a flat bottom; the lateral boundaries are given by the 400 m isobath. The Drake Passage and the throughflow between Africa and Antarctica are closed. The model is forced by a concentrated source in the Weddell Sea representing the net Atlantic gain of LCDW due to production in the Weddell Sea and inflow through Drake Passage. This net gain is termed the LCDW formation rate. It is compensated by upwelling over the rest of the Atlantic. Best agreement with observed net transport rates in the western Atlantic was found using a LCDW formation rate of about 8 Sv ($Sv = 10^6 m^3/s$). The interior transport, the transport through topographic gaps, and the transport rates of western boundary currents on the eastern flanks of topographic barriers are calculated and compared with observations where available. (Auth. mod.)

J-54307

Park, Y.H., Gambéroni, L., **Large-scale circulation and its variability in the south Indian Ocean from TOPEX/POSEIDON altimetry,** *Journal of geophysical research,* Dec. 15, 1995, 100(C12), p.24,911-24,929, 46 refs.

The first 18 months of altimeter data from the TOPEX/POSEIDON (T/P) mission were analyzed to study the large-scale mean surface circulation and its variability in the south Indian Ocean. A T/P sea level time series corrected for ocean tides was first validated against *in situ* sea level measurements from a bottom pressure recorder near Amsterdam I. A T/P-derived mean dynamic topography relative to the Ohio State University 91A geoid was compared to the output of the Fine Resolution Antarctic Model and to historical hydrographic data. The altimetric solution shows excellent agreement with the numerical model solution and indicates an anticyclonic subtropical gyre north of the Antarctic Circumpolar Current and two cyclonic subpolar gyres south of this current, respectively west and east of the Kerguelen Plateau. The western subpolar gyre corresponding to the eastern boundary of the Weddell Gyre appears to extend as far east as 60°E in the Weddell-Enderby Basin. However, the hydrography-derived dynamic topography does not reveal any clear evidence of these gyre features because of its inability to detect the barotropic component of currents. Finally, the T/P-derived sea level variability reveals clearly the well-known strong current-topography interaction in the southern ocean. (Auth. mod.)

J-54342

Spezie, G., Tucci, S., Budillon, G., Corradi, N., Piccazzo, M., **Water masses of the Ross Sea and dispersal of suspended matter** [Caratteristiche fisiche delle acque del Mare di Ross e dispersione del materiale sospeso], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.291-305, In Italian with English summary. 15 refs.

DLC G17.S69

A wide area along the western continental shelf of the Ross Sea was investigated during the Italian oceanographic cruise of 1990-1991. Temperature and conductivity parameters of water samples collected from 30 hydrological stations at various depths were determined. Total, organic and inorganic amounts of particulate suspensions were established and dimensionally analyzed. Two markedly different hydrological conditions, regarding the water temperature and concentration of the suspended matter, were found close to the slope of the continental shelf. (Auth. mod.)

J-54344

Frache, R., Mazzucotelli, A., Baffi, F., Cosma, B., Magi, E., Rivaro, P., **Trace elements and metal and organic compounds in the Ross Sea** [Elementi in tracce e composti organometallici nell'ecosistema marino della Baia di Ross in Antartide], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.313-317, In Italian with English summary. 6 refs.

DLC G17.S69

Preliminary results of investigations carried out in the Ross Sea, in the vicinity of the Terra Nova Bay Station, show a general association of metals with organic compounds of high molecular weight.

J-54346

Davis, R.E., Killworth, P.D., Blundell, J.R., **Comparison of Autonomous Lagrangian Circulation Explorer and fine resolution antarctic model results in the South Atlantic,** *Journal of geophysical research,* Jan. 15, 1996, 101(C1), p.855-884, 43 refs.

The motions of eight Autonomous Lagrangian Circulation Explorer (ALACE) floats released near 750 m depth in Drake Passage and followed through the South Atlantic are described and compared with emulations made by advecting model floats through 12 monthly snapshots of velocity from the fine resolution antarctic model (FRAM). Both ALACEs and FRAM reproduce the major features of the general circulation as follows: strong intermediate depth flow in Drake Passage, bifurcation of the Antarctic Circumpolar Current (ACC) passing over the Falkland Plateau, a strong Falkland Current, its confluence with the Brazil Current, and moderate zonal flow across the South Atlantic. Eddy kinetic energy is much stronger in the observations than in FRAM. Float dispersion in both the model and observations is due primarily to mean shear. Initial RMS particle separation of 100 km grows to nearly 1000 km after 1 year, but most of this is associated with floats that take different paths of the general circulation. The observations indicate that eddy effects are particularly important near the Falkland-Brazil Current confluence in allowing Antarctic Intermediate Water to transfer from the ACC to the SAC, from which they may enter the subtropical gyre. (Auth. mod.)

J-54348

Nicholls, K.W., **Temperature variability beneath Ronne Ice Shelf, Antarctica, from thermistor cables,** *Journal of geophysical research,* Jan. 15, 1996, 101(C1), p.1199-1210, 25 refs.

Thermistor cables have been deployed at two sites beneath Ronne Ice Shelf. One site is to the east of a submarine ridge that delineates the eastern boundary of the Ronne Depression, and the other is 100 km to the north, above the eastern slope of the depression. Long-term records from the cables (up to 22 months) indicate a large difference in the temperature variability at the two sites, being an order of magnitude greater in the Ronne Depression (site 2). The high variability in the site 2 record has allowed the construction of a simple descriptive model of the local oceanographic regime. Winter freezing in the open water north of the ice front generates Western Shelf Water (WSW), a type of High Salinity Shelf Water, which travels southwest beneath the ice shelf, appearing at site 2 as a slope-trapped current at the bottom of the water column. Site 2 is on the eastern slope of the depression where the wave-induced eastward motion forces Ice Shelf Water to rise, resulting in periodic ice-platelet formation in the water column, as surmised from conductivity-temperature-depth measurements at the site. The depth of the WSW layer decreased by 40 to 60 m during a 100-day period starting some 4 months after the beginning of the summer. (Auth. mod.)

J-54388

Cripps, G.C., **Hydrocarbons in the antarctic marine environment: monitoring and background,** *International journal of environmental analytical chemistry,* 1994, Vol.55, p.3-13, 27 refs.

The antarctic marine ecosystem is proposed as an environment in which to monitor global hydrocarbon background levels. Hydrocarbon concentrations are probably uniform throughout the southern ocean and it is difficult to resolve low levels of contamination against this background. Indices for identifying anthropogenic hydrocarbons have been found to be ambiguous, but principal component analysis has successfully identified potentially polluted inshore waters. Hydrocarbon contamination in the Antarctic occurs only at a small number of coastal locations and is limited in extent. This paper is a review of the work on hydrocarbons in the southern ocean by the British Antarctic Survey in the Bransfield Strait and Scotia Sea regions. Analytical methods are discussed and a monitoring program is developed. (Auth.)

J-54408

Ladbury, R., **Satellite mapping of Terra Incognita provides welcome relief,** *Physics today,* Sep. 1995, 48(9), p.21-22.

This brief report presents an ocean floor topographical map of the southern ocean between 30°S and 70°S. The map is color coded to depths from the surface to 8,000 m. It is based on data available from NOAA and NGDC (National Geophysical Data Center).

J-54434

Kock, K.H., Harm, U., **Areas of seabed within the 500m isobath around Elephant Island (Subarea 48.1),** *CCAMLR Science,* 1995, Vol.2, Scientific Committee and Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.131-135, With French, Russian and Spanish summaries. 4 refs.

Areas of seabed within 50 m depth contours to a depth of 100 m, and within 100 m depth contours from 100 to 500 m, have been estimated from soundings obtained during plankton and bottom trawl surveys around Elephant I. (the northernmost island of the South Shetland Is.) from 1977-78 to 1992-93. The results are presented in tables. (Auth.)

J-54436

Bonn, W.J., **Biogenic opal and barium: indicators for late Quaternary changes in productivity at the antarctic continental margin, Atlantic sector** [Biogenopal und biogenes Barium als Indikatoren für spätquartäre Produktivitätsänderungen am antarktischen Kontinentalhang, atlantischer Sektor], *Berichte zur Polarforschung,* 1995, No.180, 186p., In German with English summary. Refs. p.100-110.

Sedimentological, geochemical (in particular biogenic content) and physical properties from the Weddell, Lazarev and Cosmonaut seas along the antarctic continental margin were analyzed in order to reconstruct the late Quaternary productivity and sedimentary processes of this region. Seven undisturbed sediment cores were chosen. The sediments represent a depositional period from 400,000 years to recent time. The late Quaternary climatic changes influence changes in the paleoenvironmental and the geological conditions, directly forced by the behavior of the antarctic ice sheet. All investigated cores are positioned within the oscillating ice sheet area and reflect the influence of the ice sheet in response to the climatic cycles. The results provide an indication that organic carbon content is a preservation signal and not a productivity signal. Carbonate is not correlated with biogenic opal and biogenic barium. (Auth. mod.)

J-54444

D'Hondt, S., Arthur, M.A., **Late Cretaceous oceans and the cool tropic paradox,** *Science,* Mar. 29, 1996, 271(5257), p.1838-1841, 42 refs.

Oxygen isotopic proxies of paleo-sea surface temperatures (SSTs) suggest that Maastrichtian (about 66 mya) tropical SSTs were lower than those of today. They also demonstrate that Maastrichtian latitudinal SST gradients were much lower than those of the present. The low Maastrichtian SST gradients indicate that meridional heat transport was much greater or latitudinal differences in the balance of radiation to and from the sea surface were much less extreme during the latest Cretaceous than they are today, or that both conditions were true. These findings challenge traditional interpretations of "greenhouse" Late Cretaceous climates. The tropical oceanic temperatures are compared to those in the southern high latitudes during the same period, based on ODP and DSDP data.

J-54453

Polzin, K.L., Speer, K.G., Toole, J.M., Schmitt, R.W., **Intense mixing of Antarctic Bottom Water in the equatorial Atlantic Ocean,** *Nature,* Mar. 7, 1996, 380(6569), p.54-57, 28 refs.

Presented in this report are direct measurements which quantify the processes of the AABW flowing from western basins of the mid-Atlantic Ridge through gaps in the ridge to renew the waters in the eastern basins. The flow is vertically sheared and exhibits remarkably intense turbulence, comparable to that seen at the ocean surface in the presence of winds of ca 10 m/s. This turbulence mixes the densest waters passing through the fracture zone with the warmer overlying waters, so that the coldest waters exiting this region have been warmed by ca 0.6°C during transit. Topographic obstructions and turbulent mixing together thus determine the properties of the flows renewing the deepest waters of the Atlantic Ocean's eastern basins. (Auth. mod.)

J-54454

Yu, E.F., Francois, R., Bacon, M.P., **Similar rates of modern and last-glacial ocean thermohaline circulation inferred from radiochemical data,** *Nature,* Feb. 22, 1966, 379(6567), p.689-694, 53 refs.

Today, the ocean thermohaline circulation transports half of the ^{231}Pa produced by radioactive decay in the Atlantic Ocean water column to the southern ocean. This export respectively imparts low and high ^{231}Pa/^{230}Th ratios to the surface sediments of these oceans. Ocean sediments from the Last Glacial Maximum bear a similar isotopic fingerprint, implying that advection of North Atlantic Deep/Intermediate Water into the Circumpolar Deep Water of the southern ocean occurred at a similar—or slightly higher—rate during the last glacial period. (Auth.)

J-54458

Diester-Haass, L., Zahn, R., **Eocene-Oligocene transition in the southern ocean: history of water mass circulation and biological productivity,** *Geology,* Feb. 1996, 24(2), p.163-166, 43 refs.

High-resolution records of carbon and oxygen isotopes and benthic foraminiferal accumulation rates for the Eocene-Oligocene section at Ocean Drilling Program Site 689 (Maud Rise, Weddell Sea; paleodepth about 1500 m) were used to infer variations in paleoproductivity in relation to changes in climate and ventilation of the deeper-water column. The benthic foraminiferal abundance and isotope records show short-term fluctuations at periodicities of 100 and 400 ka, implying orbitally driven climatic variations. Both records suggest that intermediate-depth water chemistry and primary productivity changed in response to climate. It is therefore inferred that, at this time, temperature fluctuations increased and a proto-polar front formed in conjunction with the first distinct pulsations in size of the antarctic ice sheet. This major change might have resulted from an initial opening of the Drake Passage at 37 Ma, at least for surface- and intermediate-water circulation. (Auth. mod.)

J-54514

Calviño, E.D., Cantoni, L.A., **Development of a continuous thermosalinograph** [Desarrollo de un termosalinógrafo contínuo], Segundas Jornadas de Comunicaciones sobre Investigaciones Antárticas (Communication Days on Antarctic Investigations), Buenos Aires, Instituto Antártico Argentino, 1993, p.115-119, In Spanish.

DLC G845.5.J67

To meet the need for continuous measuring of ocean temperature and salinity in the process of cruising antarctic waters, plans for the construction of necessary equipment are described in detail and shown in enclosed diagrams.

J-54549

Fabiano, M., Povero, P., Danovaro, R., **Particulate organic matter composition in Terra Nova Bay (Ross Sea, Antarctica) during summer 1990,** *Antarctic science,* Mar. 1996, 8(1), p.7-13, Refs. p.12-13.

Particulate organic matter was collected in the coastal waters of Terra Nova Bay during the Oceanographic Campaign of the Italian Antarctic Research Programme in summer 1990. Particulate matter composition was analyzed for organic carbon and nitrogen, carbohydrates, proteins, lipids, nucleic acids (DNA and RNA) and ATP. A vertical stratification was evident in the study area, which resulted from prior melting of the pack ice. Suspended organic matter in the mixed layer and below the mixed layer differed in quantitative and qualitative composition. Except for ATP, all the biochemical components showed higher concentrations in the mixed layer than in the deeper waters. The particulate organic matter in Terra Nova Bay was mostly detrital and of algal origin. (Auth.)

J-54560

Berkman, P.A., Forman, S.L., **Pre-bomb radiocarbon and the reservoir correction for calcareous marine species in the southern ocean,** *Geophysical research letters,* Feb. 15, 1996, 23(4), p.363-366, 29 refs.

Four antarctic marine mollusc shells, which were collected alive between 1917 and 1940, were analyzed by accelerator mass spectrometry to provide the first pre-bomb radiocarbon measurements of biogenic carbonates from the southern ocean. Marine species and seawater measurements firmly place the radiocarbon reservoir correction at 1300±100 years for calcareous marine fossils which are widespread, abundant and well-preserved organic materials for interpreting ice-sheet, climate and sea level impacts on the antarctic marine ecosystem during the Holocene. (Auth. mod.)

J-54617

Sato, T., Okano, K., Sawagaki, T., Enomoto, H., **Tidal displacement of sea ice observed at Nisi-no-ura Cove on East Ongul Island, Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.43-48, 3 refs.

Vertical displacements of sea ice accompanied by the ocean tide were measured at Nishino-ura Cove on East Ongul I. and compared with the ocean tide observed by a pressure type tide gauge installed at the same cove. The displacements of sea ice were measured at two places which were respectively located at 20 m (P20M) and 60 m (P60M) offshore of bench mark BM No.1040. The displacement at P20M, where the sea ice is close to the fast ice, showed strong nonlinear behavior in both amplitude and phase compared with the ocean tide measured by the bottom-pressure gauge; the displacement at P60M was very consistent with the observed ocean tide. According to the 6 measurements made at P60M from May to Dec., 1993, the differences in amplitude are less than 5% as represented by the ratio of the displacement of the sea ice to the ocean tide. (Auth.)

J-54655

Fulthorpe, C.S., Carter, R.M., Miller, K.G., Wilson, J., **Marshall Paraconformity: a mid-Oligocene record of inception of the Antarctic Circumpolar Current and coeval glacio-eustatic lowstand?,** *Marine and petroleum geology,* Feb. 1996, 13(1), p.61-77, 89 refs.

The sedimentary fill of the Canterbury Basin, New Zealand is the product of a long-term (80 Ma), tectonically controlled relative sea-level cycle. The condensed section of the megasequence, resolvable in detail in outcrop and on seismic profiles, comprises a basin-wide pelagic to hemipelagic limestone interval. A regional mid-Oligocene unconformity, the Marshall Paraconformity, lies within the limestone interval onshore and correlates with hiatuses in at least two, and possibly three, offshore exploration wells and with a temporary lithological change from limestone to quartz sand at a fourth. Strontium isotopic age estimates confirm that a 2-4 Ma hiatus is associated with onshore outcrops of the Marshall Paraconformity (between 32 and 29 Ma), which correlates with the opening of the Pacific sector of the southern ocean via the Antarctic Circumpolar Current and the postulated mid-Oligocene sea-level fall. Lowering of base level, coupled with cooling and enhancement of current activity, may have caused the temporary cessation of limestone deposition and a regional hiatus. This hypothesis reconciles the apparently contradictory palaeogeographical evidence for a regional highstand. (Auth. mod.)

J-54700

Silva S., N., Ramos, M., Helbling, E.W., Holm-Hansen, O., **AMLR program: Depletion of inorganic nutrients in the area around Elephant Island, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.195-197, 9 refs.

Inorganic nutrient concentrations are generally high in antarctic waters, but significant depletions of nitrogen, phosphorus, and silicic acid have been documented in coastal areas where large phytoplankton blooms occur. In this paper, the authors report the concentrations of these inorganic nutrients from Jan. to Mar. 1994 in a large sampling grid around Elephant I. The grid includes both coastal and pelagic stations.

J-54710

Klinck, J.M., Smith, D.A., Smith, R.C., **Palmer LTER: Hydrography in the LTER region during August and September 1993,** *Antarctic journal of the United States,* 1994, 29(5), p.219-221, 5 refs.

A late-winter multidisciplinary cruise was conducted west of the Antarctic Peninsula from Aug. 29 to Sep. 23, 1993 as part of the Palmer LTER. The hydrographic measurements obtained from this cruise constitute the majority of existing winter observations for this region. This paper reports on a preliminary analysis of some of the hydrographic measurements.

J-54711

Karl, D.M., Dore, J., Houlihan, T., Hebel, D., Asper, V., **Palmer LTER sediment trap array experiment: Initial results,** *Antarctic journal of the United States,* 1994, 29(5), p.222-224, 5 refs.

The continuous production of biogenic matter in the near-surface waters of the world ocean ultimately sustains the downward flux of particles at all ocean depths. As one component of the Palmer LTER program, the authors established three bottom-moored sequencing sediment traps within the central portion of Palmer Basin near Victor Hugo I. The particle flux results from the three separate sediment trap moorings display coherence in selected, broad features but also reveal significant differences in the details of the time-series data set; these results imply that the "growing season" is fairly short in these waters despite ample light and inorganic nutrients.

J-54762

Vihma, T., **Atmosphere-surface interactions over polar oceans and heterogeneous surfaces,** *Finnish marine research,* 1995, No.264, p.3-41 + appends., Ph.D. thesis to be defended at the University of Helsinki. Refs. p.35-40. For papers included in the appendixes see 48-225 or 21F-49058, 49-2101 or 22J-51881, and 50-2110 or 22F-54128.

Processes of interaction between the atmospheric boundary layer and the planetary surface were studied with special emphasis on polar ocean surfaces: the open ocean, leads, polynyas and sea ice. The local exchange of momentum, heat and moisture were studied experimentally in the Weddell Sea and in the Greenland Sea. Exchange processes over heterogeneous surfaces are addressed by modelling studies. Over a homogeneous surface, the local turbulent fluxes can be reasonably well estimated using an iterative flux-profile scheme based on the Monin-Obukhov similarity theory. In the Greenland Sea, the near-surface air temperature and the generally small turbulent fluxes over the open ocean were affected by the sea surface temperature fronts. Over the sea ice cover in the Weddell Sea, the turbulent sensible heat flux was generally downwards, and together with an upward oceanic heat flux through the ice it compensated the heat loss from the surface via long-wave radiation. The sensible heat flux was typically from -15 to -20 W/m^2 in winter and -5 W/m^2 in summer. Over leads and coastal polynyas in the Weddell Sea, an upward heat loss from the Weddell Sea was 20-30 W/m^2. Ice motion in the Weddell Sea was found to be driven by the wind and the ocean current. The wind dominated on time scales of days, while the current became important on longer time scales. (Auth. mod.)

J-54787

Frank, M., **Reconstruction of Late Quaternary environmental conditions applying the natural radionuclides ^{230}Th, ^{10}Be, ^{231}Pa, and ^{238}U: a study of deep-sea sediments from the eastern sector of the Antarctic Circumpolar Current System** [Rekonstruktion von spätquartären Umweltbedingungen mit dem natürlichen Radionukliden ^{230}Th, ^{10}Be, ^{231}Pa und ^{238}U: eine Untersuchung von Tiefseesedimenten aus dem östlichen Sektor des Antarktischen Zirkumpolarstromsystems], *Berichte zur Polarforschung,* 1996, No. 186, 136p., With German summary. Refs. p.83-95.

High resolution radioisotope and proxy element profiles were measured on five sediment cores forming a transect over the eastern part of the Atlantic sector of the Antarctic Circumpolar Current. The aim was to achieve a more detailed reconstruction of sedimentary and paleoenvironmental conditions of this key area for global climate change during the late Quaternary. Comprehensive previous stratigraphic work can mostly be corroborated by results of the ^{230}Th$_{ex}$ dating method, by which rough average sedimentation rates may be calculated. Assuming that the increased glacial dust flux released additional iron to the surface waters of the transect, the results obtained from the sediments of the Antarctic Zone suggest that a glacial fertilization by detrital input of iron, as recently discussed, was not the case. Altogether, a glacial increase in southern ocean productivity and thus a glacial southern ocean CO$_2$ sink seem to be rather unlikely, as previously deduced from other investigations. (Auth. mod.)

J-54815

Agnew, D.C., **Ocean-load tides at the South Pole: a validation of recent ocean-tide models,** *Geophysical research letters,* Nov. 15, 1995, 22(22), p.3063-3066, 19 refs.

Small diurnal and semidiurnal gravity tides are seen at the South Pole because of the loading by and attraction of the ocean tides. These data provide a check on the quality of ocean-tide models, especially in the southernmost ocean, which has historically been the most lacking in tidal data. Ocean-tide models developed in the 1980s did not predict the gravity tides at this location very well. More recent models based on the Topex/Poseidon altimetric data and improved hydrodynamic modeling agree much better with the observations, provided that the tides beneath the ice shelves are included. The level of agreement at this remote location suggests that, loads from very local tides aside, the new generation of ocean-tide models can predict the loading tides to a very high accuracy. (Auth.)

J-54818

Abaza, V.P., Korostelev, V.G., Popov, I.K., **Disturbances in the thermohaline structure of the near-surface ocean layer in the wake of an iceberg** [Vozmushcheniia termokhalinnoĭ struktury pripoverkhnostnogo sloia okeana v slede aĭsberga], *Rossiĭskaia akademiia nauk. Doklady,* June 1995, 342(5), p.686-688, In Russian. 3 refs.

Iceberg studies were carried out during the Russian-American experiment in the Weddell Sea in 1992 (drift station Weddell-1). It was concluded that icebergs must be seen as an active element of the energy exchange in the ocean-air system in those regions where their concentration is the greatest. (Auth. mod.)

J-54859

Gerland, S., Richter, M., Villinger, H., Kuhn, G., **Non-destructive porosity determination of antarctic marine sediments derived from resistivity measurements with an inductive method,** *Marine geophysical researches,* Aug. 1993, 15(3), p.201-218, 21 refs.

The fractional porosity of marine sediments is one of the fundamental index properties of rocks. For the determination of porosity a nondestructive, inductive method was used on unsplit sediment cores from the Weddell Sea. The results were compared with galvanically measured resistivities using a miniature Wenner array on split cores. The measurements agree well except for cores with high clay content, where measurement frequency related effects cause a resistivity difference of about 10%. Porosities were derived from resistivities using a published resistivity-porosity relationship by Boyce (1968) and compared with sample porosities. A comparison of both data sets shows good agreement. (Auth. mod.)

J-54861

Labeyrie, L., et al, **Hydrographic changes of the Southern Ocean (southeast Indian sector) over the last 230 kyr,** *Paleoceanography,* Feb. 1996, 11(1), p.57-76, Refs. p.74-76.

Hydrographical changes of the southern Indian Ocean over the last 230 kyr are reconstructed using a 17 m-long sediment core. The oxygen and carbon isotopic composition of planktonic and benthic foraminifera have been analyzed. Changes in sea surface temperatures (SST) are calculated using diatom and foraminiferal transfer functions. It is suggested that changes in deep water circulation are not the cause of the early response of the surface southern ocean to climatic changes, but that the early warming and cooling of the southern ocean result from at least two processes acting in different orbital bands and latitudes: seasonality modulated by obliquity affects the high-latitude ocean surface albedo (sea ice coverage) and heat transfer to and from the atmosphere, and low-latitude insolation modulated by precession influences directly the atmosphere dynamic and related precipitation/evaporation changes, which may significantly change heat transfer to the high southern latitudes, through their control on latitudinal distribution of the major frontal zones and on the conditions of intermediate and deep water formation. (Auth. mod.)

J-54888

Sparrow, M.D., Heywood, K.J., Brown, J., Stevens, D.P., **Current structure of the south Indian Ocean,** *Journal of geophysical research,* Mar. 15, 1996, 101(C3), p.6377-6391, 44 refs.

Using recently published atlas data and the Fine Resolution Antarctic Model (FRAM), an investigation has been conducted into the structure of the frontal jets centered around the region of the islands of Crozet and Kerguelen in the south Indian Ocean. Geostrophic current velocities and transports were calculated from the temperature and salinity fields available from the atlas and compared with results from FRAM and previous studies. The authors identify the Agulhas Return Front (ARF) and the Subtropical Front (STF), as well as the following fronts of the Antarctic Circumpolar Current (ACC): the Subantarctic Front (SAF), the Polar Front (PF), and the Southern ACC Front (SACCF), from temperature and salinity characteristics and from geostrophic currents. This analysis of model and atlas data indicates that the jets associated with the ARF, STF, and SAF are topographically steered into a unique frontal system north of the islands, having some of the largest temperature and salinity gradients anywhere in the world ocean. The surface expression, carrying the bulk of the transport, is steered through the col in the Kerguelen Plateau south of the latitude normally associated with the PF at this meridian. On crossing the plateau it rejoins the subsurface expression. In the south, passing eastward along the margin of the antarctic continent and through the Princess Elizabeth Trough, a frontal jet is identified, believed to be the SACCF, placing the southern extent of the ACC in the region at 67°S. (Auth. mod.)

J-54889

Döös, K., **Meridional circulation in the southern ocean and its**

seasonal variability as seen by the fine-resolution antarctic model, *Journal of geophysical research,* Mar. 15, 1996, 101(C3), p.6393-6407, 23 refs.

A fine-resolution primitive equation model is used to investigate the seasonal variability of the circumpolar interocean mass exchange via the southern ocean. The meridional overturning is calculated on both depth levels and density layers. The interocean mass exchange is estimated from the meridional stream functions in the different oceans. The annual average is found to be mainly governed by the thermohaline circulation in the so-called oceanic conveyor belt. The seasonal variability is mainly due to changes in the wind stress, which are not necessarily local. Simple relationships with the meridional Ekman transport, the meridional thermohaline transport, and the total interocean exchange of water masses are found among the three world oceans. The meridional stream function, simulated by an analytical model, shows that seasonal variability of the fine-resolution antarctic model is barotrophic and its baroclinic circulation is mainly stationary. (Auth. mod.)

J-54900

Arntz, W., ed, Gorny, M., ed, **Cruise report of the Joint Chilean-German-Italian Magellan *Victor Hensen* campaign in 1994,** *Berichte zur Polarforschung,* 1996, No.190, 113p.

The reason to publish this cruise report in "Reports on Polar Research", despite the fact that the Magellan region is outside the South Polar Sea, lies in the intimate connection of this area to the Antarctic. A second scientific objective of the campaign was the study of latitudinal clines in population dynamics and physiology of invertebrates. The two themes carry a variety of interesting research problems including: biogeographic relationships of antarctic and Patagonian/Fuegonian fauna and flora; (dis)similarities of benthos and plankton community structure in Antarctica and the Magellan channel system; plankton communities in different basins of the Magellan Strait characterized by differing environmental conditions; spatial distribution of macroalgae and invertebrates, and interactions among algae, fish and invertebrates along the latitudinal gradient; role of suspension feeders in the benthos and plankton along the latitudinal gradient; species associations and trophic relations in the Antarctic and Magellan regions; variations of palaeo-communities during the Quaternary; and isotopic ($^{16}O/^{18}O$) composition of benthos organisms and their importance for dating.

J-54962

Maslennikov, V.V., Soliankin, E.V., **Southern ocean frontal zones as the main locations of myctophidae and krill concentrations** [Okeanologicheskie fronty v iuzhnom okeane kak osnovnye mesta massovykh skopleniĭ miktofid i krilia], *Antarktika,* 1993, No.32, p.86-93, In Russian with English summary. 25 refs.

Data obtained by numerous scientific expeditions of the All-Russia Institute of Fishery are presented. Obvious close links are established between the mesoscale disturbances of the so-called secondary frontal zone (SFZ) and the Southern Polar frontal zone (SPFZ) and the localization of krill (*Euphausia superba* Dana), and the abundance concentrations of myctophidae (*Electrona carlsbergi*) in the SFZ and SPFZ respectively. (Auth.)

J-55007

Marova, N.A., **Antarctic bottom topography and its representation on new bathymetric charts** [Rel'ef dna Antarktiki i ego izobrazhenie na novykh batimetricheskikh kartakh], *Antarktika,* 1993, No.32, p.79-85, In Russian with English summary. 23 refs.

A new set of bathymetric maps has been compiled based on a summary and analysis of the data available on the bottom topography of the Antarctic. The principal patterns of morphostructures and their genesis are discussed on the basis of the concept of plate tectonics. The heterogeneity and complex character of the morphology of the mid-oceanic ridge surrounding Antarctica are demonstrated. The patterns of bottom topography in the northern parts of the Subantarctic basins are closely related to the relief of the mid-oceanic ridges. The well-defined continuous ring of the mid-oceanic ridges is considered the natural boundary of the Antarctic. A new antarctic bathymetric map is presented. (Auth.)

J-55052

Sherman, J.W., III, **International oceanic satellites in the Global Ocean Observing System in support of polar science,** American Geophysical Union. 1993 Fall Meeting, Washington, D.C., 1993, 11p., 8 refs.

The international oceanic satellites offer a unique opportunity for numerous applications of remotely sensed data for polar science and operations. This paper will review the non-NOAA polar-orbiting sensors and satellites and their contributions to polar monitoring that are or soon will be operating in this decade. The merging of satellite observations, high-performance computers, and improved oceanic and marine meteorological models offers the first real opportunity to have a global ocean observing system. Improved surface programs offer the opportunity for high-quality data to be available for the computer models, and high-speed computers permit the models to be run in a useful time frame. These combined capabilities allow both operational and research oceanic and climatic needs to be met. Satisfying research needs takes on important new dimensions if the understanding of ocean climate and the long-term coupling of the ocean and atmosphere are to be goals of the Global Ocean Observing System support to the Global Climate Observing System. (Auth. mod.)

J-55056

Diester-Haass, L., **Late Eocene-Oligocene paleoceanography in the southern Indian Ocean (ODP Site 744),** *Marine geology,* Feb. 1996, 130(1-2), p.99-119, 70 refs.

The Late Eocene through Oligocene changes in the paleoceanography of the southernmost Indian Ocean have been reconstructed by means of a coarse fraction analysis of closely spaced samples (20 cm = about 20 kyr) from ODP Site 744, Kerguelen Plateau. Surface water productivity, reconstructed from accumulation rates of opal skeletons and benthic foraminifers is low in the early Late Eocene, increases at about 36 Ma and shows a sharp increase to maximum values in the earliest Oligocene. Changes in bottom water mass chemistry have been deduced from the degree of carbonate dissolution and its relation to productivity proxies. It is suggested that a proto-antarctic bottom water (proto-AABW) and an overlying warm, saline deep water (WSDW) from low latitudes shifted vertically and latitudinally with time and exerted their influence on the sediments of Site 744. Proto-AABW is detected by means of strong carbonate dissolution when productivity is low. WSDW is detected by means of an excellent carbonate preservation despite high productivity. (Auth. mod.)

J-55060

Kumar, N., **Trace metals and natural radionuclides as tracers of ocean productivity,** New York, Columbia University, 1994, 317p., University Microfilm order No. AADAA-I95-16132, Ph.D. thesis. Refs. passim.

Radionuclide and trace metal proxies are used to constrain the changes in bioproductivity in the South Atlantic sector of the southern ocean over glacial-interglacial timescales. The zone of maximum productivity in the South Atlantic region moved northward, from south of present-day position of the Antarctic Polar Front, to north of it during glacial periods. Increased Fe supply resulted in significant enhancement of export production in the subantarctic region of South Atlantic, consistent with the "Fe hypothesis". This increase in the subantarctic export production was sufficient to compensate for, and exceed, the decrease further south in the antarctic region. Thus, the net export production of organic carbon in the South Atlantic was higher during glacials, consistent with the "polar nutrient" hypothesis. (Auth. mod.)

J-55079

Petschick, R., Kuhn, G., Gingele, F., **Clay mineral distribution in surface sediments of the South Atlantic: sources, transport, and relation to oceanography,** *Marine geology,* Mar. 1996, 130(3-4), p.203-229, 66 refs.

Surface samples, mostly from abyssal sediments of the South Atlantic, from parts of the equatorial Atlantic, and of the Antarctic Ocean, were investigated for clay content and clay mineral composition. Maps of relative clay mineral content were compiled, which improve on previous maps by showing more details, especially at high latitudes. Near submarine volcanoes of the Antarctic Ocean (South Sandwich, Bouvet I.) smectite contents exhibit distinct maxima, which is ascribed to the weathering of altered basalts and volcanic glasses. The illite distribution can be subdivided into five major zones including two maxima revealing both South African and antarctic sources. Particularly high amounts of Mg- and Fe-rich illites are observed close to East Antarctica. They are derived from biotite-bearing crystalline rocks and transported to the west by the East Antarctic Coastal Current. Chlorite and well-crystallized dioctaedral illite are typical minerals enriched within the Subantarctic and Polar Frontal Zone but of minor importance off East Antarctica. Kaolinite dominates the clay mineral assemblage at low latitudes, where the continental source rocks (West Africa, Brazil) are mainly affected by intensive chemical weathering. Surprisingly, a slight increase of kaolinite is observed in the Enderby Basin and near the Filchner-Ronne Ice Shelf. (Auth. mod.)

J-55112

Boyle, E., **Deep water distillation,** *Nature,* Feb. 22, 1996, 37(6567), p.679-680, 14 refs.

By effectively distilling a particular pair of isotopes deep under the Atlantic, ocean circulation has recorded its own strength thousands of years into the past. This is the basic premise reported in the article by Yu et al. in this same issue of Nature. Among the consequences of the circulation of the North Atlantic Deep Water is the service it provides as a source of heat and salt for the antarctic southern ocean. Other main points of the Yu paper are noted by Boyle in this preview commentary.

J-55113

Yu, E.F., Francois, R., Bacon, M.P., **Similar rates of modern and last-glacial ocean thermohaline circulation inferred from radiochemical data,** *Nature,* Feb. 22, 1996, 379(6567), p.689-694, 53 refs.

Today, the ocean thermohaline circulation transports half of the ^{231}Pa produced by radioactive decay in the Atlantic Ocean water column to the southern ocean. This export respectively imparts low and high ^{231}Pa/^{230}Th ratios to the surface sediments of these oceans. Ocean sediments from the Last Glacial Maximum bear a similar isotopic fingerprint, implying that advection of North Atlantic Deep/Intermediate Water into the Circumpolar Deep Water of the southern ocean occurred at a similar—or slightly higher—rate during the last glacial period. (Auth.)

J-55115

Ivchenko, V.O., Richards, K.J., Stevens, D.P., **Dynamics of the Antarctic Circumpolar Current,** *Journal of physical oceanography,* May 1996, 26(5), p.753-774, 37 refs.

The dynamics of the Antarctic Circumpolar Current (ACC) in a near-eddy-resolving model of the southern ocean (FRAM) are investigated. A streamwise coordinate system is used, rather than a more conventional approach of considering zonally averaged quantities. The motivation for this approach is the large deviation from a purely zonal flow made by the current. The total effect of transient eddies is to produce a drag on the mean flow, in contrast to the zonally averaged case. The vertical penetration of stress is considered. A generalized formula is derived for the interfacial form stress averaged along a convoluted path and that includes nonquasigeostrophic effects. The interfacial form stress is found to be related not only to the local wind stress but also to changes in stratification and the Coriolis parameter along the path of integration. Using the model data, the nonquasigeostrophic effects are found to be important, particularly toward the northern flank of the ACC. By relating the vertical shear of the flow to the interfacial form stress, it is shown that the vertical structure of the flow is set by a combination of wind stress and meridional overturning. There is, therefore, an intimate linking of the wind and thermohaline-driven circulations. (Auth. mod.)

J-55116

Papalia, B., Prendin, W., Veruggio, G., **SARA, an autonomous underwater vehicle for researches in Antarctica,** Oceans '94 Conference, Brest, France, Sep. 13-16, 1994. Proceedings. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1994, p.III/617-III/620.

DLC TC1505.O33198 1994 Vol.3

Within the Italian Program for Researches in Antarctica, a project aimed at developing an autonomous underwater robot has been launched. SARA (Sottomarino Autonomo Robotizzato Antarctico) will perform a number of missions in support of oceanography, glaciology, and biology, and will constitute a platform for different applications, such as environmental survey and underwater plant observation.

J-55117

Bono, R., Bruzzone, G., Caccia, M., Grassia, F., Spirandelli, E., Veruggio, G., **ROBY goes to Antarctica,** Oceans '94 Conference, Brest, France, Sep. 13-16, 1994. Proceedings. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1994, p.III/621-III/625, 6 refs.

DLC TC1505.O33198 1994 Vol.3

The IX Italian Expedition 1993-94 of PNRA (Programma Nazionale di Richerche in Antartide) included the first experimental campaign in Antarctica in the field of underwater robotics. It can be described as a pilot mission to better define the role of this technology in future antarctic exploration. The work plan was as follows: to test and develop the CPR-IAN test-bed underwater prototype called ROBY; to verify requirements and constraints of the SARA (Sottomarino Autonomo Robotizzato Antarctica), an advanced antarctic AUV currently being designed by a consortium including CNR, ENEA, Tecnomare and others; and to help scientists collect oceanographic data. The results were satisfactory both from the technical and scientific points of view. ROBY worked well in all renditions and no electrical or mechanical problems arose from either the low temperatures or rough treatment involved in such harsh working conditions. Eighteen dives were performed at a maximum depth of 150 m for a total underwater working time of 20 hours. Most of the marine environments of Terra Nova Bay were explored and documented. (Auth. mod.)

J-55118

Gasparoni, F., Busetto, G., Cucinotta, A., **Autonomous station for meteo-oceanographic data acquisition in Antarctica: prototype development and results from the first operative phase,** Oceans '94 Conference, Brest, France, Sep. 13-16, 1994. Proceedings. Vol.3, New York, Institute of Electrical and Electronics Engineers, 1994, p.III/626-III/630, 5 refs.

DLC TC1505.O33198 1994 Vol.3

In the early 90s the Italian National Antarctic Research Program promoted a study aimed at the definition of an advanced automatic station able to operate with one year autonomy in antarctic waters, allowing continuous collection of meteo-oceanographic data. The main results of the study were the demonstration of the feasibility of a concept based on a moored ice-resistent buoy able to allocate various instrumented modules, the definition of mission requirement and relevant sensing and electronic equipment, and the identification of the most significant installation sites. In order to verify the concept in real operative conditions, a prototype of the station was developed and installed in Antarctica during the 1993-94 Italian Expedition. The site chosen is in Terra Nova Bay approximately 30 km south of the Italian Base, in about 350 m water depth, and is characterized by the presence of a polynya. Once this first operative phase is completed, the station capabilities will be extended with the adoption of meteo-oceanographic sensors and other scientific packages. In the paper a description of the prototype station is given, and the results of the experimentation and data acquisition are presented and discussed. (Auth.)

J-55120

Stoll, H.M., Schrag, D.P., **Evidence for glacial control of rapid sea level changes in the Early Cretaceous,** *Science,* June 21, 1996, 272(5269), p.1771-1774, 25 refs.

Lower Cretaceous bulk carbonate from deep sea sediments records sudden inputs of strontium resulting from the exposure of continental shelves. Strontium data from an interval spanning 7 million years in the Berriasian-Valanginian imply that global sea level fluctuated about 50 m over time scales of 200,000 to 500,000 years, which is in agreement with the Exxon sea level curve. Oxygen isotope measurements indicate that the growth of continental ice sheets caused these rapid sea level changes. If glaciation caused all the rapid sea level changes in the Cretaceous that are indicated by the Exxon curve, then an antarctic ice sheet may have existed despite overall climatic warmth. (Auth.)

J-55155

McWilliams, J.C., **Modeling the oceanic general circulation,** *Annual review of fluid mechanics,* 1996, Vol.28, p.215-248, Refs.

p.242-248.

DLC QC145.A57 Vol.28 1996

This article reviews the history, formulation, and solution behavior of relatively comprehensive numerical models for the oceanic general circulation under equilibrium surface wind stress and buoyancy flux forcing. The solution features discussed here are the wind- and buoyancy-driven lateral gyres in enclosed basins, the mostly longitudinal currents near the equator and around Antarctica, the overturning circulations, the chemical property distributions, and both forced and spontaneous variations about the time-mean circulation occurring with both meso- and large-scale flow structures. (Auth. mod.)

J-55160

Jeandel, C., Dupré, B., Lebaron, G., Monnin, C., Minster, J.F., **Longitudinal distributions of dissolved barium, silica and alkalinity in the western and southern Indian Ocean,** *Deep-sea research,* Jan. 1996, 43(1), p.1-31, Refs. p.19-21.

Dissolved Ba, Si and alkalinity contents are reported for 11 vertical profiles along a longitudinal section in the western and southern Indian Ocean, sampled during 1985-1987. Barium concentrations increase from 30 nmol/kg at the surface to 100 nmol/kg at depth in the southern ocean. Vertical variations result from mixing of water masses as well as biologically controlled uptake/regeneration processes. By means of a water-mass mixing model, the non-conservative Ba signal was determined and compared to that of silica. In the south, no release of Ba is observed in Circumpolar Deep Waters, whereas calculations show that Ba is somewhat supersaturated with respect to barite in the upper 3000 m of the southern waters. Thus, whereas surface Ba uptake is probably governed by the biological activity, Ba regeneration in deep waters appears to be controlled by saturation. Barium is correlated linearly with alkalinity at each station, but the slopes of the regression line vary by a factor greater than 2 along the section. (Auth. mod.)

J-55169

Gille, S.T., Kelly, K.A., **Scales of spatial and temporal variability in the southern ocean,** *Journal of geophysical research,* Apr. 15, 1996, 101(C4), p.8759-8773, 38 refs.

Spatial and temporal variability in Geosat altimeter data are used to consider whether the Antarctic Circumpolar Current (ACC) responds on a large scale to global changes in wind forcing or whether its variability is primarily mesoscale. The Geosat data indicate a spatial decorrelation scale of 85 km and a temporal *e*-folding scale of 34 days. Using these scales to define autocovariance functions, the sea surface height variability is objectively mapped. The resulting maps indicate substantial evidence of mesoscale eddy activity. Over 17-day time intervals, meanders of the Polar Front and Subantarctic Front appear to elongate, break off as rings, and propagate. Statistical analysis of ACC variability from altimeter data is conducted using empirical orthogonal functions (EOFs). Neither complex nor extended EOFs indicate statistically significant traveling wave modes. (Auth. mod.)

J-55171

Coles, V.J., McCartney, M.S., Olson, D.B., Smethie, W.M., Jr., **Changes in Antarctic Bottom Water properties in the western South Atlantic in the late 1980s,** *Journal of geophysical research,* Apr. 15, 1996, 101(C4), p.8957-8970, 44 refs.

Data collected in 1988-89 as part of the South Atlantic Ventilation Experiment have been combined with the historical database to study the circulation and water mass variability of the abyssal water in the Argentine Basin. A map of potential temperature at 4000 m used as an indication of geostrophic shear defines a south and western intensified crescent-shaped abyssal recirculation. Within this recirculation, and its northward extension to the Brazil Basin, Antarctic Bottom Water (AABW) properties have undergone two modifications during the 1980s: (1) the water mass cooled (0.05°C) and freshened (in salinity ratio) on surfaces of constant density; (2) the densest layer of AABW was altered to less dense water through mixing or advection out of the study area. This water mass change does not appear to have affected the flow pattern. It is suggested that open ocean convective events within the Weddell Sea contributed to the change in AABW documented here. (Auth. mod.)

J-55196

Moriarty, D.J. W., O'Donohue, M.J., **Organic carbon transport from the southern ocean and bacterial growth in the antarctic intermediate water masses of the Tasman Sea,** *Marine ecology progress series,* Mar. 23, 1995, 119(1-3), p.291-297, 25 refs.

The concept that organic carbon is transported to the equatorial region at intermediate water depths from subantarctic frontal zones has been reinvestigated using the tritiated thymidine method to determine rates of bacterial DNA synthesis in water masses of the Tasman Sea. There was a higher bacterial growth rate and thus a higher flux of organic carbon through bacteria in the Antarctic Intermediate Water (900-1000 m depth) than in the water masses immediately above or below in the Tasman Sea east and south of Tasmania. Values for bacterial production were 4 to 8 micro-g C/m^3/d, which are equivalent to a consumption of about 3 to 6 µl O_2/l/yr. In the deeper layer at 1200 to 1500 m, rates were 3 to 4 times lower. These rates are compatible with other data on oxygen utilization. The results support the concept that organic matter sinks with downwelling water in the zone between the Subtropical Convergence and the Polar Front in the southern ocean and is advected towards the equator below the photic zone. (Auth.)

J-55204

Melles, M., Kuhn, G., Fütterer, D.K., Meischner, D., **Processes of modern sedimentation in the southern Weddell Sea, Antarctica—evidence from surface sediments,** *Polarforschung,* 1994 (Pub. 1995), 64(2), p.45-74, 107 refs.

Seventy surface sediment samples from the continental shelf and slope of the southern Weddell Sea have been analyzed for grain-size distributions, chemical composition, mineral assemblages in the clay fraction, biogenic and terrigenous components in the coarse fraction, and stable isotope ratios in planktonic foraminifera. New information is presented on modern sedimentary processes and their dependence on the present-day physiographical, glaciological and hydrographical setting. The circulation of the water masses as reflected in the surface sediments differs in detail from that known from *in situ* measurements. Regional differences in both the biogenic production and the preservation of biogenic components are controlled by the physical and chemical properties of the water masses rather than by differences in the sea-ice coverage or in water depth. (Auth. mod.)

J-55208

Jiang, L., Garwood, R.W., Jr., **Numerical study of three-dimensional dense bottom plumes on a Southern Ocean continental slope,** *Journal of geophysical research,* Sep. 15, 1995, 100(C9), p.18,471-18,488, 33 refs.

Three-dimensional features of dense bottom plumes flowing over continental shelf with or without along-slope topographic variations are investigated by simulating the evolution of a density front at a southern ocean continental shelf break, using a three-dimensional, primitive equation numerical model with a second-order turbulence closure scheme embedded. The focus of investigation is the role of topography in determining mixing and the offshore transport of dense shelf water during the transient adjustment process of a density front over a continental slope. The authors compare and discuss the numerical simulations for two cases: a uniform shelf and slope case and a case with a canyon that leads from the coast to the deep ocean crossing the shelf and the slope. The numerical simulations indicate that baroclinic instability, planetary rotation, bottom friction, and topography play major roles in determining the surface and bottom plume formation, the growth and penetration depth of the bottom plumes, and the characteristics of water mass on the slope. (Auth. mod.)

J-55232

Figueiras, F.G., Pérez, F.F., **Ice-edge hydrography between Elephant I. and the South Orkneys, summer 1988-1989** [Hidrografía al borde del hielo entre las islas Elefante y las Orcadas del Sur durante el verano austral 1988-1989], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.9-23, In Spanish with English summary. 19 refs.

DLC G845.S93

During the austral summer of 1988-89 the RV *Professor Siedlecki* made an oceanographic cruise along the ice edge between Elephant I. and the South Orkneys. The intention was to test the hypothesis of various authors that the melting of the pack-ice is responsible for primary productivity in antarctic waters. The results obtained during this cruise show that, in the region studied, it is the convergence of Scotia Sea and Weddell Sea waters which is responsible for the necessary stability in the photic zone. The stability is generated by a series of surface meanders of the Antarctic Circumpolar Current, which allow phytoplankton biomass to accumulate in the contact zone with Weddell Sea water. It is concluded that this situation has a typical frontal structure, with phytoplankton patches in the convergence between two water masses. In these circumstances, the contribution of ice melting, if any, remains unclear. (Auth. mod.)

J-55233

Prego, R., Pérez, F.F., Figueiras, F.G., **Hydrography of Admiralty Bay in the summer of 1988-1989** [Hidrograía de Admiralty Bay, isla King George, Antártida, al comienzo del verano austral de 1988-89], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.24-29, In Spanish with English summary. 17 refs.

DLC G845.S93

During the Polish-Spanish Antarctic Expedition on board the *Professor Siedlecki*, Dec. 26-27, 1988, sea water samples were taken in Admiralty Bay and analyzed for salinity, temperature, oxygen, pH, nitrate, silicate, organic carbon and chlorophyll. Results show that the surface water down to 20 m is poorer in nutrient salts than the sea water. The highest values of chlorophyll concentrations were found at 30 m depth. Below 75 m, a high concentration of organic carbon, low concentration of oxygen and increased silicate and nitrate concentrations suggest an area of remineralization.

J-55234

Alvarez de Meneses, A., **Dissolved oxygen saturation in waters studied during the "Antártida 86 11" expedition** [Saturación de oxigeno disuelto en las aguas investigadas durante la campaña "Antártida 86 11"], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.30-47, In Spanish with English summary. 12 refs.

DLC G845.S93

During the "Antártida 86 11" cruise, the degree of oxygen saturation in waters of the Scotia Sea was determined. A close relationship was found between the presence of a deep warm current and the degree of oxygen saturation when the latter is below the 65% level.

J-55254

Catalán, M., **Oceanographic investigations in the southern Bransfield Strait, 1987-1989** [Las campañas 1987-1988, 1988-1989 al sur del mar de Brandsfield. Resultados científicos], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.172-175, In Spanish with English summary.

DLC G845.S93

After a review of the geological history of Bransfield Strait, the Shetland Is. and the Antarctic Peninsula, details of two oceanographic surveys carried out in the area during the 1987-88 and 1988-89 expeditions are presented.

J-55275

Lario Gómez, J., **Cleaning up the pollution caused by the sinking of the *Bahía Paraíso*** [Tareas de descontaminación en el área afectada por el hundimiento del *"Bahía Paraíso"* (isla Anvers, Antártida)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.377-379, In Spanish with English summary.

DLC G845.S93

The operations involved in the cleaning up of the oil spilled from the sinking of the *Bahía Paraíso* are described. In view of the ecological damage caused by the accident, some suggestions are made toward dealing more efficiently with such emergencies in the future.

J-55353

Titus, J.G., Narayanan, V.K., **Probability of sea level rise,** Washington, D.C., U.S. Environmental Protection Agency, 1995, 186p., Numerous end-of-chapter refs.

DLC GC89.T57 1995

This report develops probability-based projections that can be added to local tide-gauge trends to estimate future sea level at particular locations. The key coefficients in these models are based on subjective probability distributions supplied by a cross-section of climatologists, oceanographers, and glaciologists. This report estimates that global temperatures are most likely to rise 1°C by the year 2050 and 2°C by the year 2100; that there is a 10% chance that temperatures will rise more than 4°C in the next century, and a 90% chance that they will rise by at least the 0.6°C warming of the last century. By contrast, IPCC (1992) estimated that a warming of 2.8°C was most likely. The temperature estimates are lower because (a) lower concentrations of carbon dioxide are assumed; (b) the cooling effects of sulfates and stratospheric ozone depletion are included; and (c) the panel of experts included a scientist who doubts that greenhouse gases will substantially increase global temperatures. Data from Greenland and antarctic ice sheets are included. (Auth. mod.)

J-55398

Willmott, A.J., Edwards, N.R., Killworth, P.D., **Abyssal circulation in a circumpolar basin driven by discrete sources of buoyancy,** *Journal of physical oceanography,* Jan. 1996, 26(1), p.49-64, 16 refs.

The purpose of this paper is to present a simple, time-dependent model of the buoyancy-driven abyssal circulation in the southern ocean that highlights the role of mixing, topography, and water loss parameterizations. The southern ocean is an important region for the global abyssal circulation because (i) it supports the pathways for interbasin water exchange and (ii) the marginal seas of Antarctica are sources of deep water (e.g., Antarctic Bottom Water), which enters the southern ocean and contributes to the driving of the global thermohaline circulation. (Auth. mod.)

J-55438

Diester-Haass, L., Robert, C., Chamley, H., **Eocene-Oligocene preglacial-glacial transition in the Atlantic sector of the southern ocean (ODP site 690),** *Marine geology,* May 1996, 131(3-4), p.123-149, Refs. p.147-149.

High resolution interdisciplinary analyses of the clay and coarse fractions of ODP Leg 113 Site 690, Eocene-Oligocene sediments on the flank of the Maud Rise, provide information on paleoproductivity, water masses, paleoclimate and erosion in the antarctic range as well as on the cyclicity of these processes. Three time intervals are distinguished: the middle Eocene, characterized by cyclic variations which correspond to changes in clay mineral associations; the latest middle Eocene-late Eocene, characterized by low productivity values increasing with time; the Oligocene, separated from the Eocene by a hiatus, and characterized by high productivity, highly increased amounts of illite and other minerals originating from erosion and physical weathering of Antarctica, and by cyclic variations of clay mineral indices which appear to be synchronous with productivity variations with a 400-450 kyr cyclicity. (Auth. mod.)

J-55468

Golubeva, E.N., Ivanov, IU.A., Kuzin, V.I., Platov, G.A., **Numerical modeling of the world ocean circulation with the upper mixed-layer parametrization** [Chislennoe modelirovanie tsirkuliatsii Mirovogo okeana s uchetom verkhnego kvaziodnorodnogo sloia], *Okeanologiia,* May-June 1992, 32(3), p.395-405, In Russian with English summary. 18 refs.

The changes occurring when modeling the world ocean general circulation using a one-component model as a result of introducing a parameterization for the upper quasihomogeneous layer (UQL) are analyzed. Among the modeling results related to the introduction of the UQL to the model, of greatest interest are changes in the subsurface current field, including the orientation of the Antarctic Circumpolar Current (ACC) into a strictly eastward direction. (Auth. mod.)

J-55475

Loewe, F., **Some observations in the surface layers of antarctic waters,** *Marine observer,* July 1950, 1 leaf (both sides).

In Feb.-Mar. 1948, personnel aboard the Royal Australian Navy Research Ship *Wyatt Earp*, although not performing an extensive oceanographic program, made some oceanographic observations, mainly of sea water temperatures to a depth of about 150 fathoms. The results are compared to similar measurements made about a year earlier.

J-55479

Siple, P.A., **Antarctic geography,** Antarctica in the International Geophysical Year. Geophysical monograph no. 1, Washington, D.C., [American Geophysical Union], 1956, p.13-17, 1 ref.

Although currently two-fifths of this five million square-mile continent is yet to be seen for the first time, there is every likelihood that before the IGY draws to a close most of the major geographic discoveries will have been made. Concepts of the Antarctic Continent have gradually improved. The Continent appears to be a 'siamese-like' juncture of two large land masses. The portion lying mostly in the western hemisphere, conveniently designated West Antarctica, is only about half as large as East Antarctica. The latter is believed to be a massive Precambrian shield superimposed by a great dome of snow and ice, and toward its center reaching in excess of 13,000 feet elevation. The smaller West Antarctica is more folded in character and the ice dome near its center is probably less than 10,000 feet high. Where these land masses come in close contact, a high-faulted mountain forms a backbone to the whole continental mass. Between the continental glacial domes and these high mountains, natural troughs tend to channel katabatic surface winds off the Continent. During the forthcoming IGY, glacial and seismic programs will add greatly to the knowledge concerning the thickness of the ice cap and the surface beneath. (Auth. mod.)

J-55504

Steineck, P.L., Thomas, E., **Latest Paleocene crisis in the deep sea: ostracode succession at Maud Rise, southern ocean,** *Geology,* July 1996, 24(7), p.583-586, 31 refs.

During the late Paleocene thermal maximum (ca. 55-50 Ma) mid-bathyal ostracodes at Maud Rise in the southern ocean (Ocean Drilling Program Site 689) underwent a sudden, dramatic turnover synchronous with a global extinction in deep-sea benthic foraminifers and with large-scale, short-lived negative excursions in the stable isotope record of foraminiferal calcite. A previously stable and long-lived ostracode assemblage was replaced within ≈10 k.y. by a taxonomically novel association of small, thin-walled opportunistic and generalist forms that persisted for ≈25-40 k.y. Thereafter, ostracode faunas recovered and common bathyal forms returned, although species were smaller and/or less-heavily calcified than before the turnover. Ostracode data are in agreement with the hypothesis that the latest Paleocene extinctions in the deep sea were caused by a change in the dominant source area of intermediate water mass from high altitudes to the subtropics. These data also suggest that warm saline waters persisted at Maud Rise for the next 100 k.y. (Auth. mod.)

J-55572

Tseĭtlin, V.B., **Estimating the mean annual primary production and outflow of organic carbon in Antarctica** [Otsenka srednegodovykh velichin pervichnoĭ produktsii i eksportnogo potoka organicheskogo ugleroda v Antarktike], *Rossiĭskaia akademiia nauk. Doklady,* Nov. 1995, 345(3), p.401-403, In Russian. 13 refs.

The aim of this work was to estimate the mean annual values of primary productivity and, related to it, the outflow of organic carbon from the upper 100-m zone in the southern ocean. Data on seasonal variations in the biomass of antarctic zooplankton were used in the calculations. Assuming a section of the antarctic zone of the southern ocean equal to $38 \cdot 10^6$ km^2, its annual primary productivity is approximately $1.7 \cdot 10^9$ tC, while the organic flow is $0.29 \cdot 10^9$ tC. (Auth. mod.)

J-55576

Rakusa-Suszczewski, S., **Hydrography of Admiralty Bay and its inlets, coves and lagoons (King George Island, Antarctica),** *Polish polar research,* 1995, 16(1-2), p.61-70, With Polish summary. Refs. p.68-70.

The environments of inlets, coves and lagoons vary widely. Climate warming has lead to retreat of glaciers directly entering the sea. In lagoons this is accompanied by exposure of an uncolonized substratum. Colonization processes in these lagoons appear to describe processes which have previously occurred in bays and fjords of glacial origin in the South Shetlands. A hydrographic map of Admiralty Bay and surrounding areas is included. (Auth.)

J-55607

Lynch-Stieglitz, J., Van Geen, A., Fairbanks, R.G., **Interocean exchange of Glacial North Atlantic Intermediate Water: evidence from Subantarctic Cd/Ca and carbon isotope measurements,** *Paleoceanography,* Apr. 1996, 11(2), p.191-201, Refs. p.200-201.

New measurements of Cd/Ca ratios for glacial benthic foraminifera from the continental shelf and slope off Tasmania and South Australia are presented. When combined with glacial carbon isotope measurements, these data from the glacial Subantarctic Zone suggest that a water mass with a high value of the conservative tracer $\delta^{13}C_{as}$ occupied not only the shallow (1-2 km) portions of the Atlantic and Pacific Oceans but was present in the glacial Subantarctic as well. The oceanic Cd concentrations (Cd_w) predicted for the glacial Subantarctic are intermediate between those from the glacial Atlantic and the glacial Pacific, supporting the idea that Glacial North Atlantic Intermediate Water may have reached the intermediate depth Pacific via the Antarctic Circumpolar Circulation. (Auth.)

J-55608

Mackensen, A., Hubberten, H.W., Scheele, N., Schlitzer, R., **Decoupling $\delta^{13}C\Sigma CO_2$ and phosphate in recent Weddell Sea deep and bottom water: implications for glacial southern ocean paleoceanography,** *Paleoceanography,* Apr. 1996, 11(2), p.203-215, Refs. p.214-215.

On a section between 72°S and 42°S and a transect between 60°E and 10°E through the Weddell Sea and the southernmost eastern Atlantic Ocean, the water column was sampled on 72 stations and the stable carbon isotopic composition of total dissolved inorganic carbon ($\delta^{13}C\Sigma CO_2$) as well as the stable oxygen isotopic composition of seawater ($\delta^{18}O$) was determined. These data were compared with potential temperature, salinity, dissolved oxygen and phosphate data from the same stations. The observed $\delta^{13}C\Sigma CO_2/PO_4^{3-}$ relationship in the deep Weddell Sea strongly differs from the global Redfield-driven deep water relationship. The authors attribute this to enhanced thermodynamic fractionation at sites of bottom water formation that decouples the nutrient signal from the $\delta^{13}C\Sigma CO_2$ signal not only in surface and intermediate water masses but also in deep and bottom water. A discussion of simple hypotheses of Weddell Sea deep and bottom water formation during glacial times reveals that regardless of what scenario is considered, the thermodynamic imprint on southern ocean deep water would increase. (Auth. mod.)

J-55644

Macdonald, A.M., Wunsch, C., **Estimate of global ocean circulation and heat fluxes,** *Nature,* Aug. 1, 1996, 382(6590), p.436-439, 36 refs.

Although ocean circulation and the consequent exchange of heat and gases with the atmosphere exert a strong influence on climate, discussions of global circulation have previously been highly schematic, non-quantitative and/or based upon mutually inconsistent regional studies. Presented here is a dynamically and kinematically consistent estimate of the magnitude and structure of global ocean circulation and its associated heat fluxes, derived by integrating hydrographic velocity data over the rapid spatial variations that they show. No single overturning cell is found, but instead a complex and probably time-varying circulation pattern. The simplest interpretation suggests that there are two nearly independent cells: one connecting overturning in the Atlantic Ocean to other basins through the southern ocean, and the other connecting the Indian and Pacific basins through the Indonesian archipelago. (Auth.)

J-55673

Danabasoglu, G., McWilliams, J.C., **Sensitivity of the global circulation to parameterizations of mesoscale tracer transports,** *Journal of climate,* Dec. 1995, 8(12), p.2967-2987, 51 refs.

The isopycnal transport parameterization of Gent and McWilliams has been implemented in the GFDL ocean general circulation model, replacing the physically unjustifiable horizontal mixing of tracers. The effects of this parameterization are investigated in a global domain. A comparison of its results with those of the conventional horizontal diffusion shows substantial and significant improvements in several climatically important aspects of the ocean circulation. These improvements include a sharper main thermocline cooler abyssal ocean, elimination of the Deacon cell as a tracer transport agent, zonally integrated meridional heat transport and surface heat fluxes in better agreement with observations, and better confinement of the locations where deep convection occurs. The sensitivity of the model to the magnitude of the horizontal and isopycnal diffusion coefficients is also studied, showing that the domain averages of potential temperature and salinity, the mass transport of the Antarctic Circumpolar Current, and the meridional mass transport in the Northern Hemisphere all increase with decreasing diffusivity. (Auth. mod.)

J-55674

Gràcia, E., et al, **Morphostructure and evolution of the central and eastern Bransfield Basins (NW Antarctic Peninsula),** *Marine geophysical researches,* June 1996, 18(2/4), p.429-448, 35 refs.

The Bransfield Basin is a narrow and elongated active rift basin located between the Antarctic Peninsula and the South Shetland Is. Six large volcanic edifices aligned with the basin axis stick out of the sedimented seafloor of the Central Bransfield Basin. In contrast, the Eastern Bransfield Basin is characterized by four deep troughs displaying a rhombic shape and small, scattered volcanic cones located in the southwestern half basin. Seamount volcanism plays an important role in the formation of new crust in the Bransfield Basin. Morphological analysis of the seamounts indicates a multi-staged volcano-tectonic construction. The distribution and shape of these edifices suggests that both volcanism and extension are concentrated at the same preferential areas through time. This might be related to the fracturation style of the continental crust. The Central and Eastern Bransfield Basins are very different in morphostructure, volcanism, and sedimentary cover. The Central Bransfield Basin shows evidence of NW-SE extensional faulting and focused active MORB-volcanism interpreted as result of incipient seafloor spreading. The Eastern Bransfield Basin is still in a rifting stage, mainly dominated by a NW-SE extension and some left-lateral strike-slip component probably related to the South Scotia Ridge. (Auth. mod.)

J-55676

Rapier, C.B., Michael, K.J., **Calibration of a small, low-cost thermal infrared radiometer,** *Remote sensing of environment,* May 1996, 56(2), p.97-103, 11 refs.

Two Everest 4000A radiometers were used to measure sea surface temperatures in the southern ocean from the RSV *Aurora Australis* during the periods Aug. 7-Oct. 9, 1993 and Jan. 1-Mar. 1, 1994. On four separate occasions, the radiometers were calibrated under controlled laboratory conditions using a Thermos 60-L cooler, a cool room and a Contherm unit. The calibration results were best when the radiometers and calibration target were allowed to come to equilibrium at a set temperature, yielding r.m.s. differences of 0.1°C between the measured and actual target temperatures. When the radiometers were operated under conditions of rapid temperature change, the r.m.s. differences were found to be as large as 0.6°C. The bias error of the radiometers was found to have changed subsequent to each of their deployments in the southern ocean, which underlines the importance of monitoring changes in the offset of the radiometers in the field. (Auth. mod.)

J-55684

Hughes, C.W., **Antarctic Circumpolar Current as a waveguide for Rossby waves,** *Journal of physical oceanography,* July 1996, 26(7), p.1375-1387, 30 refs.

Results from the Fine Resolution Antarctic Model suggest that much of the eddy activity in the southern ocean takes the form of eastward propagating wavelike structures, and there is evidence from altimetry that this may be true of the real southern ocean. In the model, eastward propagating waves in the core of the Antarctic Circumpolar Current (ACC) are separated by a sharp boundary from westward propagating waves to the north. The theory of Rossby wave interactions with a zonal barotropic current predicts complicated behavior involving the formation of strongly nonlinear critical layers associated with Reynolds stress divergences. The ACC is neither truly zonal nor barotropic, but diagnostic quantities suggested by the idealized models show similar dynamics occurring in this more complicated situation. This interaction between mean flow and Rossby waves may be crucial to understanding how the ACC interacts with bottom topography. (Auth.)

J-55694

De Souza, R.B., **Study of the surface circulation to the north of Bransfield Strait, Antarctica** [Estudo da circulação superficial ao norte do Estreito de Bransfield, Antártica], São José dos Campos, Instituto Nacional de Pesquisas Espaciais, Nov. 1992, 161p., INPE-5742-TDI/503, Master's thesis. In Spanish with English summary. Refs. p.149-161.

A study of the mesoscale circulation to the north of Bransfield Strait using the displacement trajectory of a Brazilian drifting buoy, tracked by NOAA 10 and 11 satellites in 1989, is presented. Buoy positional data, together with *in situ* oceanographic and meteorological data, were used to obtain a detailed description of the surface current. With a mean velocity of 7.5 cm/s and a highly zonal direction, the current derived from the buoy trajectory was in great part forced by winds, in agreement with the Ekman model. The ARGOS-compatible Brazilian drifting buoy is shown to be an efficient tool in mesoscale studies, offering the possibility of delineating oceanic fronts, fluxes of water masses with known characteristics, and atmospheric and tidal influences on the surface currents. Results of such studies can be used as support to more complex studies in the areas of air-sea interaction, climatology, and distribution of planktonic organisms of economic interest. (Auth. mod.)

J-55695

Boltovskoy, E., Boltovskoy, D., Correa, N., Brandini, F., **Planktic foraminifera from the southwestern Atlantic (30°-60°S): species-specific patterns in the upper 50 m,** *Marine micropaleontology,* May 1996, 28(1), p.53-72, 48 refs.

The present work presents the planktic distributional patterns of foraminiferal assemblages recorded in the upper 50 m of the southwestern Atlantic, between the subtropics and the Antarctic. Comparison with similar collections from the North Atlantic and with sedimentary data from the South Atlantic reveals some major problems in the application of microfossil data for paleoceanographic surveys. (Auth.)

J-55699

Mel'nikov, I.A., **Weddell-1 ice drift station in Antarctica,** *Oceanology,* Mar.-Apr. 1995, 35(2), p.286-288, Translated from Okeanologiia.

The Russian-U.S. Weddell-1 Expedition carried out investigations in the western Weddell Sea from Feb. through June 1992. The main goal of the expedition was to investigate the physical-oceanographic, meteorological and biological processes and the interactions in the water-ice-atmosphere system in this poorly studied region of Antarctica. The expedition was organized jointly by several U.S. universities supported by the National Science Foundation and by the former USSR State Committee on Hydrometeorology and the USSR Academy of Sciences, financially supported by the USSR State Committee on Science and Technology. A distinctive feature of the expedition was that it conducted its investigations on the sea ice rather than on board a research vessel. This drifting research station was the first in the history of studying Antarctica. (Auth. mod.)

J-55706

Yang, T.Z., Zhao, J.S., Xu, J.P., **Water masses and circulation**

around the South Shetland Islands in summer, Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.1-13, In Chinese with English summary. 13 refs.

DLC G845.5.C45 1989 Orien China

The hydrographic data presented were obtained during the First Chinese Southern Ocean Expedition in summer 1984-85; the water masses and circulation of waters adjacent to the South Shetland Is. are described. Results show that the waters in the Bellingshausen Sea consist of Antarctic Summer Surface Water, Antarctic Winter Water, Antarctic Circumpolar Deep Water and Antarctic Bottom Water. In the Bransfield Strait, the horizontal distribution of water masses can be roughly divided into the northern Bransfield Strait waters (Brs), the southern Bransfield Strait waters (Brw) and the Bransfield Strait central waters (Brc). Brs originates mainly from the surface water of the Bellingshausen Sea, whereas Brw is dominated by Weddell Sea water. Brc, which is a cold water mass with high salinity, is found mainly in the deep and bottom layers of the Strait. (Auth. mod.)

J-55707

Xu, J.P., Zhao, J.S., Yang, T.Z., **Relations between the characteristics of physical oceanography and krill in the sea areas around the South Shetland Islands,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.14-25, In Chinese with English summary. 9 refs.

DLC G845.5.C45 1989 Orien China

Based on data obtained in waters around the South Shetland Is. from Dec. 26, 1984 to Feb. 12, 1985, an analysis was made of the relationship between krill abundance and the distribution of water temperature and salinity. Results show that in the Bellingshausen Sea, the water masses consist of 3 layers: the Antarctic Surface Water (0-50m), with high temperature and low salinity; the Subsurface Cold Water (50-200m), with lower temperature and higher salinity; and the Antarctic Circumpolar Water (200m to the maximum surveyed depth), with high temperature and high salinity. In the Bransfield Strait, features of mixed water were observed due to the influence of the Bellingshausen and Weddell seas. Krill was found to adapt to higher temperatures and lower salinity of the surface water; the subadult krill could survive in surface water with low temperature and high salinity; and krill larvae were observed in the subsurface and deep waters, below the water bodies with high temperature and low salinity.

J-55708

Miao, Y.T., Yu, H.H., **Sketch of hydrographic structure and circulation in the waters near Wilkes Land, Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.26-35, In Chinese with English summary. 6 refs.

DLC G845.5.C45 1989 Orien China

Oceanographic observations carried out in waters off Wilkes Land in the summer of 1985 revealed a deep-water area, a sharp continental slope, and a shallow continental-shelf area. All surface temperatures were found to be lowest in the southern portion of the surveyed area; surface salinity was low due to melted ice; and the oxygen content was high in the upper layer. The vertical structure of temperature and salinity is divided into 5 types: the upper homogenous layer, with high temperature and low salinity; seasonal thermohaline; winter residual water layer, with the lowest temperature readings; transient water layer, in which salinity and temperature increase with depth; and the bottom layer, with variable temperature and salinity values. Two current systems were observed: the Antarctic Circumpolar Current in the northern sector and a westward current in the southern portion of the surveyed area.

J-55709

Fang, X.H., Zhang, Y.L., He, J.F., **Characteristics of fine structures at some CTD stations during the First Chinese Southern Ocean Expedition,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.36-41, In Chinese with English summary. 8 refs.

DLC G845.5.C45 1989 Orien China

Analysis of data collected during the First Chinese Southern Ocean Expedition shows small variability in water temperature, salinity and density in the surveyed area. Various types of fine structures caused by different processes, such as melting of surface ice, increase in temperature, wind occurrence, entrainment, bidiffusion or sinking due to mixing, all of them irreversible, were observed. The spectrum of vertical wave number for the temperature gradient shows, at all depths, a reversible fine structure caused by internal waves. (Auth. mod.)

J-55710

Su, Y.F., **Relation between distribution of phytoplankton and sea water stability,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.42-48, In Chinese with English summary. 2 refs.

DLC G845.5.C45 1989 Orien China

The water stability in the southern ocean, showing a stratification phenomenon in the structure of the water masses, is discussed. Understanding the distribution of the layer with maximal stability associated with the water masses, which represents a barrier restricting eddy diffusion and homogenization of hydrographic properties, was found helpful in the study of phytoplankton distribution. This is considered to be an important factor in the exploitation of marine biological resources.

J-55715

Wang, Y.H., Dong, H.L., Xu, H.L., **Study of chemical characteristics of water masses in the Bransfield Strait and its adjacent areas,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.69-74, In Chinese with English summary. 4 refs.

DLC G845.5.C45 1989 Orien China

Based on data collected in Bransfield Strait during the first Chinese antarctic expedition, the chemical characteristics of different water masses are discussed. Results show that the Si/*S* ratio is important for current identification; the water N/P content was found to range from 17 to 11. The water vertical structure, chemical characteristics and the typical depths of different water masses were determined by T-O_2 and AUO-P diagram curves. Causes of the formation of different water masses and differences in their chemical elements are discussed. (Auth. mod.)

J-55716

Wang, Y.H., Dong, H.L., Xu, H.L., **Distribution, regeneration and cycle of nutrients in the Bransfield Strait and its adjacent areas,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.75-80, In Chinese with English summary. 5 refs.

DLC G845.5.C45 1989 Orien China

Analysis of data collected in the Bransfield Strait during the first Chinese antarctic expedition shows that the nutrient values are higher along the coast and decrease gradually seaward. The vertical distribution of nutrients reflects obvious spring layers. The regeneration of nutrients begins within these layers and extends to the bottom, at the continental shelf, and down to 500 m offshore. The maximum content of phosphate occurs at 300 m depth. The cycle of nutrients is completed through the convection of sea water during winter and by upwelling. These areas, rich in nutrients, show very high phytoplankton content. (Auth. mod.)

J-55722

Li, F.R., **Preliminary study of oxygen-minimum layer in water area adjacent to the South Shetland Islands and north of the Ardley Island, Antarctica, in summer,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.113-118, In Chinese with English summary. 6 refs.

DLC G845.5.C45 1989 Orien China

A study of the vertical distribution of oxygen in oxygen-minimal regions showed the following: the depth at which the oxygen content greatly decreases coincides with the depth of pycnocline; there is a thick water layer with low oxygen content; and the oxygen-minimum layer occurs below the thermocline. According to initial results of correlation analysis, the variation of oxygen-minimum layer is related to the physical properties of deep-water circulation and biochemical processes in sea water. (Auth. mod.)

J-55723

Ruan, Z., **Behavior of mercury in seawater to the northwest of the Antarctic Peninsula,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.119-125, In Chinese with English summary. 12 refs.

DLC G845.5.C45 1989 Orien China

Studies on concentrations of total mercury and inorganic mercury in waters to the northwest of the Antarctic Peninsula are presented. The changes of mercury in horizontal and vertical directions and the relations between concentration of mercury and nutrients are discussed. Mercury and phosphate are linearly related by the expression: total mercury (ng/L)=2.98 PO_4 -P(μg/L)-1.29 (r=0.89); organic mercury (ng/L)=3.37 PO_4 -Pu(μg/L)-3.95 (r=0.75); and inorganic mercury (ng/L)=1.47 PO_4 (μg/L)-0.79 (r=0.70). The effect of high concentrations of atmospheric mercury over the water is described. (Auth. mod.)

J-55757

Song, D.K., **Sea floor relief features of the Great Wall Bay, King George Island, Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.413-416, In Chinese with English summary.

DLC G845.5.C45 1989 Orien China

Characteristics of the bay giving access to the Great Wall Station are described, including the bay's sea floor topography, its morphology, the maximum and the minimum water depth, and the navigation channel characteristics. Many differences between the inner bay and the outer bay features are pointed out.

J-55780

Espino, M., García, M., Puigdefábregas, J., Figa, J., Arcilla, A.S., **Numerical analysis of the wind-induced circulation in the Bransfield Strait (Antarctica) using ERS-1/WSC winds,** Workshop on ERS-1 Pilot Projects, 1st, Toledo, Spain, June 22-24, 1994. Proceedings, Paris, European Space Agency, Oct. 1994, p.37-40, ESA SP-365, 6 refs.

DLC QE33.2.A7W67 1994

One of the goals of the Pilot Project "Application of ERS-1 products to Geophysical Research in Antarctica" (PP2-E1) was to assess the characteristic wind-induced circulation patterns in the Bransfield Strait region during austral summer. From a data set corresponding to the period Dec. 1992 to Apr. 1993, 21 synoptic wind fields covering the study area were extracted. A simple method was established to interpolate the wind velocity and direction at error-flagged nodes and to reassess the wind direction where necessary. The directional distribution of the computed WSC (Weddell-Scotia Confluence) wind fields compares reasonably well with the few available local meteo statistics. On the other hand, the WSC winds exhibit a spatial variability which could not be resolved by local observations. Representative WSC wind fields have been selected and used to force a quasi-3D primitive equation finite element circulation model developed at LIM/UPC. (Auth. mod.)

J-55787

Sen Gupta, R., Sarkar, A., Kureishey, T.W., **PCBs and organochlorine pesticides in krill, birds and water from Antarctica,** *Deep-sea research II,* Jan. 1996, 43(1), p.119-126, 22 refs.

This study concerns the various pesticides, DDT compounds and PCBs, found in the krill, emperor penguins, and in the waters around the Indian Station Dakshin Gangotri in the period Dec. 1987-Jan. 1988. Collection procedures, extraction of the pesticides and preservation regimens are explained. Results are displayed in a series of tables and graphs.

J-55853

Mihalopoulos, N., Nguyen, B.C., Belviso, S., **Carbonyl sulfide concentrations in the surface waters and above the Indian Ocean,** Liège International Astrophysical Colloquium, 28th, June 26-30, 1989. Proceedings. Our changing atmosphere, edited by P.J. Crutzen, J.C. Gerard, and R. Zander, Liège, Université de Liège, Institut d'Astrophysique, 1989, p.477-486, 13 refs.

DLC QC851.L44 1989

During two oceanographic cruises in Apr.-May 1986 and July 1987, the authors measured COS concentrations in surface seawater and in the marine atmospheric boundary layer in the Indian Ocean (East African coastal areas, Amsterdam I., the Somali upwelling area and open ocean). The results show that surface waters of the Indian Ocean are supersaturated with respect to the atmosphere. Taking into account the seasonal and geographical variations of the supersaturation factor, a global oceanic flux of 0.32 Tg COS is estimated. (Auth.)

J-55854

Holby, O., Anderson, L.G., **Geochemistry in an area recently uncovered from the Filchner Ice Shelf,** *Continental shelf research,* Sep. 1996, 16(11), p.1479-1488, 23 refs.

Sediments were studied in the southern Weddell Sea that had been both covered by the ice shelf prior to 1986 (ICS) and outside the ice shelf. The composition of particulate matter in these sediments shows that the sedimentation under the ice shelf is quantitatively similar to that outside the ice shelf, except that the former has a negligible content of easily degradable organic matter, indicating a very low biochemical activity. The ^{210}Pb profile from the ICS station gave a sedimentation rate of 0.02 cm/y. This accumulation rate, combined with a particulate carbon content of approximately 1%, yields an annual net accumulation of 1.7 g C/m^2. The profiles of nutrients in the interstitial water (under the ice shelf) indicate a very small flux to the overlaying water. Outside the ice shelf the flux is significantly higher, though still small. (Auth. mod.)

J-55872

Klepikov, A., **Southern ocean oceanography and models,** Advanced Study Institute on the Physics of Ice Covered Seas, Savonlinna, Finland, June 6-17, 1994. Selected papers, Savonlinna, 1994, var. p., 31 refs.

Recent analysis of data obtained in Jan.-Feb. 1988 in the eastern part of the Weddell Gyre by the mesoscale survey of three USSR research vessels showed a complicated hydrographic structure that results from the intensive interaction between the waters of the Weddell Gyre and Antarctic Circumpolar Current (ACC). Three types of mesocale features were found: warm-core eddies of circumpolar origin; warm-core eddies formed at the Weddell Front; and cold-core features from the Cold Regime of the Weddell Gyre. The inflow of the CDW into the gyre is facilitated by the sharp southward excursion of the ACC core at about 26°E due to the topographical constraint of the mid-ocean ridge. Intense warm-core eddies forming at the Antarctic Polar Front (APF) and drifting southward are visible in GEOSAT altimeter data as relatively high sea-level variability. This investigation was followed by using GEOSAT altimetry data and historical hydrographic data to estimate some characteristics of warm ACC rings in the sector 20-40°E. (Auth. mod.)

J-55876

He, J.F., Chen, B., Huang, F.P., **Seasonal changes of chlorophyll *a* and oceanographic conditions under fast ice off Zhongshan Station, East Antarctica in 1992,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.23-34, In Chinese with English summary. Refs. p.33-34.

Chlorophyll *a* concentrations under sea ice near Zhongshan Station, monitored from Apr. 12 to Dec. 30, 1992, were lower than 0.5 mg/m^3 during wintertime, and lowest (0.1 mg/m^3) from July to Sep. The concentrations began to rise during spring, and reached the maximum value of 21.40 mg/m^3 in mid-Dec. in surface water following the ice algal bloom, and then decreased quickly again. The ratios of nanoplankton (<20 µm) biomass to the total phytoplankton biomass were commonly higher than 50% in winter, but decreased following the increasing biomass in spring; the ratio in surface water was only 3.2% during the phytoplankton bloom. The nutrients were sufficient to support the growth of phytoplankton, but the concentrations decreased during spring. Comparison of phytoplankton of biomass in the water column and sea ice shows it to be less significant under the ice. Because the primary production is mostly distributed at the bottom of the ice and in the surface water, the role of ice-water interface in the ecosystem is considered to be very important. (Auth. mod.)

J-55890

Kampel, M., De Costa, M.P., Hungria, C.S., Setzer, A.W., **Evaluation of image receptor APT/AVHRR for oceanographic studies in Antarctica** [Avaliação preliminar da utilização de um receptor de imagenes orbitais AVHRR/NOAA para estudos oceanográficos na Antártica], *Academia Brasileira de Ciencias. Anais,* 1993, Vol.3, Brazilian Remote Sensing Symposium, 7th, Curitiba, Brazil, May 10-14, 1993, p.56-59, In Portuguese with English summary. 9 refs.

DLC G70.5.B6S56 1993

A preliminary evaluation of image receptor APT of the AVHRR sensor was carried out during the 11th Brazilian antarctic expedition in order to estimate water surface temperature. Temperature data (bucket temperature and XBT) were collected and used to calibrate orbital data and monitor the ocean vertical structure. The image receptor showed a satisfactory operational performance. The use of temperature surface data obtained by satellite was limited by the presence of cloud cover. (Auth.)

J-55891

Desideri, P.G., Lepri, L., Checchini, L., Santianni, D., Masi, F., Bao, M., **Organic compounds in antarctic sea-water and pack-ice,** *International journal of environmental analytical chemistry,* 1995, Vol.61, p.319-330, 17 refs.

Pack-ice and sea-water samples collected at different depths from Terra Nova Bay and Ross Sea during the 1990-91 Italian Antarctic Expedition were analyzed using HRGC and GC-MS. Several classes of biogenic and anthropogenic organic compounds were identified and measured in both matrices. The results showed the changes in the organic composition at varying depths of pack-ice and sea-water and the enrichment of organic compounds in the pack. (Auth.)

J-55899

Pakulski, J.D., et al, **Iron stimulation of antarctic bacteria,** *Nature,* Sep. 12, 1996, 383(6596), p.133-134, 12 refs.

The experiment reported here entails the addition of $FeSO_4$ to the waters of Gerlache Strait during Oct. 1995. The iron enriched samples showed an approximately twofold increase in bacterial cell densities and a fourfold increase in specific growth at three different temperatures. Because the experiments were conducted in the dark and in the absence of bacterial grazers, the data suggest that the stimulatory effect resulted from the Fe enrichment. A caveat, however, is that the results and conclusion may be relevant only to the locale and season in which the experiments were carried on. Still, colleagues are urged to consider these results in future Fe experimentations.

J-55931

Cai, W.J., Baines, P.G., **Interactions between thermohaline- and wind-driven circulations and their relevance to the dynamics of the Antarctic Circumpolar Current, in a coarse-resolution global ocean general circulation model,** *Journal of geophysical research,* June 15, 1996, 101(6C), p.14,073-14,093, 46 refs.

A series of experiments is described in which the ocean flow is driven by wind forcing only, thermohaline forcing only, or both. In a global ocean with topography, the circulation driven by wind alone is strongly influenced by contours of constant potential vorticity, which limit the barotropic transport to relatively small values. With the same geometry the flow driven by relaxing to observed surface temperature and salinity fields alone contains deep overturning circulation, producing NADW and AABW, and a large barotropic Antarctic Circumpolar Current (ACC) generated by bottom form stress. The ACC is dependent on the overturning circulation, the deep density field and the bottom form stress and increases with A_{TV}, the vertical mixing coefficient. If wind is added to this flow, the additional circulation is also dependent on the baroclinic structure but decreases with increasing A_{TV}. This applies especially to the ACC, where wind-induced additions are much larger than when the wind acts alone in a homogeneous ocean. An analysis of the dynamic balance of the ACC in the model shows that it is governed by lateral friction, bottom form stress, and wind. The mechanism for driving the ACC by deep convection and bottom topography is revealed in special experiments with simplified topography. (Auth. mod.)

J-55941

McPhee, M.G., Ackley, S.F., **Antarctic Zone Flux Experiment,** *American Meteorological Society. Bulletin,* June 1996, 77(6), p.1221-1232, 39 refs.

Understanding what environmental conditions could again trigger widespread oceanic overturn may be an important key in determining the role of high latitudes in deep-ocean ventilation and global atmospheric warming. During the Antarctic Zone Flux Experiment in July and Aug. 1994, response of the Weddell Sea upper ocean and its ice cover to a series of storms was measured at two drifting stations supported by the National Science Foundation research icebreaker *Nathaniel B. Palmer.* This article describes the experiment, in which fluxes of heat, mass and momentum were measured in the upper ocean, sea ice and lower-atmospheric boundary layer. Initial results illustrate the importance of oceanic heat flux at the ice undersurface for determining the character of the sea ice cover. They also show how the heat flux depends both on high levels of turbulent mixing during intermittent storm events and on large variability in the stratified upper ocean below the mixed layer. (Auth. mod.)

J-55943

De Souza, R.B., Stevenson, M.R., **Oceanographic study from satellite drifting buoy and hydrographic data** [Descrição de frentes oceânicas a partir de uma bóia de deriva rastreada por satélite e de dados hidrográficos durante a VII Expedição Antártica Brasileira], *Academia Brasileira de Ciencias. Anais,* 1993, Vol.4, Brazilian Remote Sensing Symposium, 7th, Curitiba, Brazil, May 10-14, 1993, p.290-299, In Portuguese with English summary. 14 refs.

DLC G70.5.B6S56 1993

A drifting buoy developed at INPE was launched north of the Bransfield Strait during the 7th Brazilian Antarctic Expedition. The buoy, tracked by NOAA satellites via the ARGOS System, remained at sea from Jan. 26 to Feb. 21, 1989. Using hydrographic data collected *in situ* by the Brazilian oceanographic support ship *Barão de Teffé,* the horizontal distributions of sea water temperature (T), salinity (S) and density were determined. By comparing the buoy's trajectory with the T, S and density distributions, it was noted that variations in the flow patterns measured by the buoy were caused by the presence of two oceanic fronts in the study area. From the results of this experiment, it is shown that the Brazilian drifting buoys tracked by the ARGOS System are suitable tools to detect and describe oceanic fronts on a synoptic basis. (Auth. mod.)

J-55944

Da Silva, C.L., Jr., Stevenson, M.R., De Carvalho, P.R.A., **Perspective on Brazilian drifting buoys positioned by satellites in low orbit** [Retrospectiva e perspectiva no Brasil das bóias de deriva rastreadas por satélites de órbita baixa], *Academia Brasileira de Ciencias. Anais,* 1990, Vol.3, Brazilian Remote Sensing Symposium, 6th, Manaus, Brazil, June 24-29, 1990, p.553-560, In Portuguese with English summary. Refs. p.559-560.

DLC G70.39.S55 1990

During the mid-1980s, INPE, through Project MEDICA (Medição da Corrente Antártica) developed and produced its first prototype drifting buoy, positioned by satellites in polar orbit via Service ARGOS in Brazil. The starting point of this new phase of national oceanographic instrumentation was directly connected to the development by INPE of a DCP (Data Collection Platform) and its subsequent certification by Service ARGOS. This work describes the evolution of this type of technology in Brazil during the past 6 years, as well as its performance in collecting oceanographic and meteorologic data, in both local and antarctic waters, in quasi real-time. The quality of data obtained from this Lagrangian system provided a strong background for the significant future participation of Brazilian oceanographers in international programs, such as TOGA and WOCE. These programs focus on studies of the climatological variability on a global scale, in which use will be made of numerical models of the weather, calibrated from data collected by movable platforms placed in remote regions of the ocean. (Auth.)

J-55945

Stevenson, M.R., Da Silva, C.L., Jr., **Comparison of geostrophic circulation with trajectory measurements of satellite tracked buoys in the eastern Bellingshausen Sea, Antarctica,** *Academia Brasileira de Ciencias. Anais,* 1990, Vol.3, Brazilian Remote Sensing Symposium, 6th, Manaus, Brazil, June 24-29, 1990, p.561-569, With Portuguese summary. 11 refs.

DLC G70.39.S55 1990

Satellite-tracked drifting buoys offer the marine scientist a powerful tool for the direct measurement of surface currents, through the progressive displacement of these drifters with time. This study compares estimates of the surface current obtained from two Brazilian buoys with the indirect geostrophic circulation in the Bellingshausen Sea. Mean currents for the nearshore and offshore buoys were 13 cm/s toward 201° and 2 cm/s toward 101°, respectively, estimated from linear regression of the trajectories. Two maps of geostrophic circulation, one from the start of the experiment, the other from the end of it, were compared with the trajectories. Inspection of the buoy trajectories showed the presence of one or more eddies in the flow field, the largest one having a period of about 17 days. Eddy-like motion for the offshore trajectory contributed 33-38% to the overall trajectory, compared to 3-4% for the nearshore trajectory. Estimates of the energy due to eddy motion showed the offshore trajectory to contain 6-18 times more eddy motion than for the nearshore trajectory. (Auth.)

J-55972

Sadarangani, S.H., Krishnamoorthy, T.M., Gopinath, D.V., **Tritium concentrations in surface waters of Indian Ocean and in lakes around Indian station Maitree in Antarctica,** *Indian journal of marine sciences,* Dec. 1995, 24(4), p.192-195, 18 refs.

DLC GC721.I48

Spatial distribution pattern of tritium in the surface waters of the Indian Ocean reveals a minima at the equator, a primary peak of about 15 TU between 30°S and 40°S and secondary peaks of about 10 TU between 50°S to 67°S latitudes. The asymetric nature of the tritium distribution pattern is discussed in relation to hydrographic characteristics of the region. Tritium concentrations in some fresh water samples collected near around Indian station Maitri are also presented. (Auth.)

J-55977

Fieg, K., **Ocean as a part of the coupled climate system: an attempt to reconstruct the glacial circulation with different models of the atmosphere** [Der Ozean als Teil des gekoppelten Klimasystems: Versuch der Rekonstruktion der glazialen Zirkulation mit verschieden komplexen Atmosphärenkomponenten], *Berichte zur Polarforschung,* 1996, No.206, 128p., In German with English summary. 103 refs.

The goal of this thesis is to investigate the sensitivity of the Atlantic circulation to the surface forcing fields, e.g., wind stress, sea surface salinity (SSS) and sea surface temperatures (SST). Both the recent and the glacial Atlantic circulation are simulated and compared with ideas developed from drilling cores (glacial) and observations (modern). A model was developed for these elements and combined with models of other parameters. A set of experiments was devised to account for energy balance, sea ice distribution and drift, and varying degrees of sea surface salinity in antarctic waters. As various components of the models were shifted about through the experiments, in which some were omitted and others added, it became clear that a given set of paramaters could be successful for recent or glacial data, but not for both. (Auth. mod.)

J-55996

Krupitsky, A., Kamenkovich, V.M., Naik, N., Cane, M.A., **Linear equivalent barotropic model of the Antarctic Circumpolar Current with realistic coastlines and bottom topography,** *Journal of physical oceanography,* Sep. 1996, 26(9), p.1803-1824, 45 refs.

A linear equivalent barotropic (EB) model is applied to study the effects of the bottom topography H and baroclinicity on the total transport and the position of the Antarctic Circumpolar Current (ACC). It is shown that the asymptotic behavior of the solution of the barotropic model (a particular case of the EB model) in the limit of very small bottom friction depends on subtle details of topography and basin geometry. The authors conclude that the barotropic model is not robust with respect to possible variations of model topography. The authors found that the EB model reproduces the position and the transport of the ACC reasonably well. The solution is robust with respect to uncertainties in H. The EB model is much improved by a parameterization of the bottom friction via near-bottom velocity, which tends to shut off the flow in the shallow regions. (Auth. mod.)

J-56009

Hughes, C.W., Smithson, M.J., **Bottom pressure correlations in the south Atlantic,** *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2243-2246, 14 refs.

Bottom pressure in the Fine Resolution Antarctic Model (FRAM) shows regions of the South Atlantic Ocean where fluctuations are dominated by small-scale internal variability of the currents, and are not directly related to the wind. There are often very sharp boundaries between these regions and regions of large scale coherence. Bearing this in mind, the measured coherence of bottom pressure recorder (BPR) measurements near Tristan da Cunha island in the South Atlantic is taken as evidence that mesoscale variability associated with the Antarctic Circumpolar Current reaches further north in the model than in reality. There are many possible reasons for this, but the significant result is that the BPR measurements can provide useful information about the dynamical regime of the deep ocean, which can not be discovered by surface measurements. (Auth. mod.)

J-56019

Meredith, M.P., Van Scoy, K.A., Watson, A.J., Locarnini, R.A., **On the use of carbon tetrachloride as a transient tracer of Weddell Sea deep and bottom waters,** *Geophysical research letters,* Oct. 15, 1996, 23(21), p.2943-2946, 22 refs.

Antarctic bottom waters have long been known to be a mixture of Circumpolar Deep Water and Shelf Water. Recent observations show that in the antarctic bottom waters of the Scotia Sea and northern Weddell Sea, the ratios of carbon tetrachloride (CCl_4) to chlorofluorocarbons (CFC-11, 12) are inconsistent with the ratios observed in the surface layer of the Weddell Sea. This is the result of a deficit of CCl_4 in the bottom waters, and renders the compound unsuitable for use as a transient tracer from which apparent ages can be derived directly. The summer near-surface temperature minimum of Antarctic Surface Water exhibits a similar inconsistency, demonstrating that CCl_4 can be removed from cold waters with high oxygen levels, probably through a biological process. It is inferred that Shelf Water features a similar CCl_4 deficit which is transferred to the new antarctic bottom waters upon formation, accounting for the observed deep CCl_4 deficit. (Auth. mod.)

J-56020

Jacobs, G.A., Mitchell, J.L., **Ocean circulation variations associated with the Antarctic Circumpolar Wave,** *Geophysical research letters,* Oct. 15, 1996, 23(21), p.2947-2950, 12 refs.

Altimeter data analysis indicates persistent sea surface height (SSH) anomalies propagating eastward about the antarctic continent. The spatial and temporal characteristics match variations in the atmosphere and sea surface temperature (SST) that are associated with the Antarctic Circumpolar Wave (ACW). During the observation time period, the SSH appears quasiperiodic with a dominant 4 year period and 180° longitude wavelength. Thus, the SSH signature of the ACW appears as two anomalies on opposite sides of the antarctic continent propagating eastward at 10 cm/s. The SSH response to observed wind forcing agrees in terms of amplitude and phase with simple quasigeostrophic dynamics. (Auth. mod.)

J-56039

Koshliakov, M.N., Sazhina, T.G., **Meridional volume and heat transport by large-scale geostrophic currents in the Pacific sector of the Antarctic,** *Oceanology,* June 1996, 35(6), p.767-777, Translated from Okeanologiia. 12 refs.

Hydrophysical and current data measurements by an acoustic doppler current meter were obtained in 1992, along 67°S in the Pacific Sector of the Antarctic, and were analyzed for the purpose of estimating the meridional volume and heat transports connected with large-scale geostrophic currents. Large-scale components of all initial hydrophysical fields were obtained by optimal smoothing of these fields along the section. The obtained pattern of geostrophic currents, involves boundary currents at the antarctic continental slope, the volume transports of which were also estimated. The heat transport connected with the barotropic component of this pattern is not representative climatically, because of the instability of this component. The baroclinic mode of the distribution of geostrophic currents includes a vertical component of water circulation, averaged over the section, with currents toward the antarctic continent in the upper part of the ocean and in the opposite direction in the lower part. This mode of currents provides integral heat transport toward the antarctic continent that can be treated as a possible mechanism for the compensation of the annual heat flux from the ocean to the atmosphere in this region. (Auth. mod.)

J-56044

Ohshima, K.I., Takizawa, T., Ushio, S., Kawamura, T., **Seasonal variations of the antarctic coastal ocean in the vicinity of Lützow-Holm Bay,** *Journal of geophysical research,* Sep. 15, 1996, 101(C9), p.20,617-20,628, 23 refs.

During the period of 1990-1992, year-round oceanographic observations were conducted in the vicinity of Lützow-Holm Bay, East Antarctica. It was found that the thickness of the Winter Water (WW) layer, characterized by a cold fresh oxygen-rich water, exhibits its maximum in the austral fall (typically 500 m) and its minimum in the austral summer (typically 350-400 m). The associated density variation of the water column explains only about one third of the seasonal variations in sea level at the coast, which suggests a large seasonal variation in barotropic coastal flow. Prominent freshening occurs in the WW layer during fall. This appears to be caused by the accumulation of WW, whose upper portion is freshened in the preceding summer. These seasonal variations appear to occur every year. The authors propose that the seasonal variation in the WW layer is caused by the seasonal variation in the wind over the coastal ocean. (Auth. mod.)

J-56046

Meredith, M.P., Vassie, J.M., Heywood, K.J., Spencer, R., **On the temporal variability of the transport through Drake Passage,** *Journal of geophysical research,* Oct. 15, 1996, 101(C10), p.22,485-22,494, 22 refs.

A recently obtained series of bottom pressure measurements from various positions in the Drake Passage (DP) has been used to estimate the transport variability of the Antarctic Circumpolar Current (ACC). The standard deviations in derived transport range from 5.3 Sv in 1993 to 8.9 Sv in 1990. These data suggest that the ACC transport can be persistently less variable over several years than was previously thought. In particular, the International Southern Ocean Studies (ISOS) data set contains two large-amplitude changes in pressure difference over timescales less than 2 weeks, while no similar events were observed in the more recent data. Although the more recent pressure gauges were deployed at different positions to those used in ISOS, their reliability as indicators of ACC transport changes has been established by examination of simultaneous pressure measurements within DP. (Auth. mod.)

J-56047

Sakai, K., Peltier, W.R., **Multibasin reduced model of the global thermohaline circulation: paleoceanographic analyses of the origins of ice-age climate variability,** *Journal of geophysical research,* Oct. 15, 1996, 101(C10), p.22,535-22,562, 44 refs.

A new, multibasin reduced model of the global thermohaline circulation has been developed that builds upon the single-basin Atlantic model recently described in Sakai and Peltier [1995]. The model comprises individual, two-dimensional, Atlantic, Indian, and Pacific components which are linked via a circumpolar basin representative of the southern ocean. It also includes a complete seasonal cycle for sea surface temperature, a sea ice component, and an acceptably accurate representation of the influence of both wind stress and bottom topography. The circulation in the individual basins is described using a stretched coordinate system in order to allow the use of reduced vertical resolution where high resolution is unnecessary. The authors also describe a sequence of paleoceanographic experiments that have been designed to explore the sensitivity of the deep circulation to the impact of the specific surface freshwater anomalies that are known to have developed during the last deglaciation event of the current ice age. The simulation of the response of the thermohaline circulation to such anomalies provides strong additional support for the notion that modulation of the strength of the overturning flow in the Atlantic basin played a very important role in the Younger-Dryas climate reversal. (Auth. mod.)

J-56077

Nicholls, K.W., **Analysis of a 22-month thermistor cable record from the ocean beneath Site 2, Ronne Ice Shelf,** Filchner-Ronne Ice Shelf Programme (FRISP), Report No.9 (1995), compiled by H. Oerter, Bremerhaven, Alfred-Wegener-Institute for Polar and Marine Research, 1995, p.80-86, 3 refs.

DLC G890.F55.R47

During the austral summer of 1991-92 a hot-water drill was used to create an access hole at Site 2, Ronne Ice Shelf. The ice was found to be 541 m thick, overlying a water column about 380 m deep. Using oceanographic probes lowered into the water via the access hole a sequence of CTD profiles were made, and several water samples were retrieved. At the end of the measurement period thermistor cables were lowered into the borehole and allowed to freeze in place. One of the cables extended to within 40 m of the sea floor, with thermistors spaced at approximately 35 m intervals through the water column. It is the analysis of a 22-month record from this cable that is the subject of this report. By comparing the thermistor cable results with the temperature profiles from the CTD measurements it seems that the worst affected thermistor was the deepest, suffering a shift equivalent to 0.10°C. In this report the authors are concerned more with the temperature variability than the absolute values.

J-56104

Ichii, T., Naganobu, M., **Surface water circulation in krill fishing areas near the South Shetland Islands,** *CCAMLR Science,* 1996, Vol.3, Scientific Committee and the Commission for the Conservation of Antarctic Marine Living Resources. Journal. Edited by E. Sabourenkov, p.125-136, With French, Russian and Spanish summaries. Refs. p.129-130.

This paper describes tracks followed by 6 surface drifting buoys that were deployed in shelf and oceanic waters to the north of the South Shetland Is. Based on buoy tracks, the surface circulation to the north of the South Shetlands shelf was described as a slow sluggish southwest current with a series of small-scale circular and semi-circular flows in the shelf region, whereas the circulation in the oceanic region was described as the strong northeast current. The picture obtained of the surface circulation was considered in conjunction with the distribution of krill catches taken in the area by Japanese vessels during the period from 1981 to 1994. It is suggested that the sluggish and shear currents observed to the north of the islands may have properties which contribute to the formation of stable krill concentrations in the area. The observed long-distance movements of three buoys also suggested that oceanic currents may transport krill from the South Shetland Is. to South Georgia and the South Orkney Is. on a time scale of 110 to 120 and 85 days respectively. (Auth. mod.)

J-56119

Alverson, K., Owens, W.B., **Topographic preconditions of**

open-ocean deep convection, *Journal of physical oceanography,* Oct. 1996, 26(10), p.2196-2213, 25 refs.

Evidence for oceanic convection over Maud Rise in the Weddell Sea suggests that bottom topography may select the location and scale of deep convecting oceanic chimneys forced by seasonal large-scale atmospheric cooling. In this paper, the role of bottom topography in open-ocean deep convection is studied using an idealized three-dimensional primitive equation model. A barotropic mean flow impinges on a Gaussian-shaped seamount in a stratified domain generating a Taylor cap (a region of topographically trapped fluid). Convection within this region is significantly enhanced relative to ambient levels away from the seamount and to similar numerical simulations performed without bottom topography. An analytic formula for one-dimensional nonpenetrative convection into an exponential stratification profile is derived and compares well with results from the numerical model. Parameter dependencies for these topographic preconditioning mechanisms are discussed. These numerical results suggest that bottom topography can play an important role in selecting the location and horizontal scale of deep convection in the ocean. (Auth. mod.)

J-56120

Warren, B.A., LaCasce, J.H., Robbins, P.E., **On the obscurantist physics of "form drag" in theorizing about the Circumpolar Current,** *Journal of physical oceanography,* Oct. 1996, 26(10), p.2297-2301, 30 refs.

The authors point out that, since the "form-drag" force balance commonly advanced for the Antarctic Circumpolar Current is really just a statement that northward Ekman transport in the circumpolar Drake Passage zone is compensated by deep southward geostrophic flow, the balance is actually irrelevant to the magnitude of the current itself. It is thus misleading to ascribe a role to form drag in its physics. Sverdrup dynamics seems to offer a more promising analysis of the real Circumpolar Current—as proposed long ago. (Auth.)

J-56125

Jaeger, J.M., Nittrouer, C.A., DeMaster, D.J., Kelchner, C., Dunbar, R.B., **Lateral transport of settling particles in the Ross Sea and implications for the fate of biogenic material,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,479-18,488, 24 refs.

The Ross Sea with its high rates of primary productivity and biogenic accumulation, provides an important location to test the validity of a one-dimensional particle-settling model. As part of an interdisciplinary field project performed from 1990 to 1992 to examine cycling and accumulation of biogenic matter in the Ross Sea, water-column particulate and current data were collected at three sites. At each site, a current meter and sediment trap were placed 240 m below the water surface, and at 40 m above the seabed. The moorings were deployed for 1- to 2-years duration. The current-meter records showed that the speed of flow in the southwestern Ross Sea is relatively slow and current direction is highly variable. Currents in the south-central Ross Sea have moderate speeds and less directional variability. The northwestern Ross Sea has the strongest flows and least variability in direction. Two models were developed to determine the net displacement of particles settling through the water column. One model evaluated vertical particle advection and the second estimated lateral particle advection. The pattern in displacement trends correlates well with observed sediment types and accumulation rates at each site. A one-dimensional model for the settling of biogenic material is most applicable at the southwestern site and least applicable at the northwestern site. (Auth. mod.)

J-56127

DeMaster, D.J., Ragueneau, O., Nittrouer, C.A., **Preservation efficiencies and accumulation rates for biogenic silica and organic C, N, and P in high-latitude sediments: the Ross Sea,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,501-18,518, Refs. p.18,516-18,518.

Rates of biogenic sediment accumulation (biogenic silica and organic C, N, and P) and pore water flux have been established for a variety of depositional environments in the Ross Sea. On the basis of ^{14}C measurements in kasten cores, sediment accumulation rates ranged from 250 cm/kyr in the coastal basin of Granite Harbor to 1-2 cm/kyr in the shelf and slope environments of the northern and eastern Ross Sea. The preferential preservation of biogenic silica relative to organic carbon was apparent in Ross Sea sediments because the biogenic silica/organic carbon ratio in the material buried in the seabed generally was 2 times greater than the ratio in sediment particles arriving at the sediment-water interface. The total amount of biogenic silica accumulating on the Ross Sea shelf is approximately an order of magnitude less than the Ledford- Hoffman et al. [1986] estimate that was based on ^{210}Pb chronologies. Biogenic silica accumulation rates in the southern, central, and western Ross Sea increased during the mid and late Holocene, reaching their maximum values during the past 500 to 1000 years. (Auth. mod.)

J-56128

Nelson, D.M., DeMaster, D.J., Dunbar, R.B., Smith, W.O., Jr., **Cycling of organic carbon and biogenic silica in the southern ocean: estimates of water column and sedimentary fluxes on the Ross Sea continental shelf,** *Journal of geophysical research,* Aug. 15, 1996, 101(C8), p.18,519-18,532, Refs. p.18,530-18,532.

The authors examined the cycling of organic carbon and biogenic silica in the water column and upper sediments of the Ross Sea, seeking to understand the processes leading to the formation of opal-rich, organic-poor sediments over much of the southern ocean. Between Jan., 1990 and Dec., 1994 three cruises were conducted to measure rates of primary production, nitrate-based "new" production, biogenic silica production and biogenic silica dissolution in the upper 50 m over most of the Ross Sea shelf in spring, mid summer and late summer. They deployed sediment traps from Jan., 1990 to early Mar., 1992 to measure the mid-water (250 m) and near-bottom gravitational fluxes of particulate organic carbon, nitrogen and biogenic silica year-round at three sites, and obtained sediment cores at 15 sites to assess the accumulation rates of organic carbon and biogenic silica in all known sediment regimes on the shelf. These data permit estimates of the annual production, near-surface recycling, vertical sinking flux, delivery to the seabed, benthic regeneration and long-term burial of both organic and siliceous material integrated over 75-80% of the Ross Sea shelf. The resulting annual budgets for carbon and silica indicate highly selective preservation of biogenic silica over organic carbon between 50 and 250 m in the water column, as well as in the upper seabed. Both silica preservation and the decoupling between the cycles of silica and carbon must be even more effective in the waters overlying abyssal southern ocean sediments than they are over the Ross Sea shelf. (Auth. mod.)

J-56189

Whitehouse, M.J., Priddle, J., Trathan, P.N., Brandon, M.A., **Substantial open-ocean phytoplankton blooms to the north of South Georgia, South Atlantic, during summer 1994,** *Marine ecology progress series,* Sep. 12, 1996, 140(1-3), p.187-197, Refs. p.196-197.

Substantial open-ocean phytoplankton blooms in the Antarctic Zone to the northwest of South Georgia, South Atlantic are described. Chlorophyll *a*, nutrient and physical oceanography data, collected Jan. 2-5 and Feb. 2-4, 1994 along a 450 km transect comprising 14 stations, are presented. The transect crossed the Subantarctic and the Polar Front (PF). During the Jan. transect survey, in 2 locations to the south of the PF, average surface mixed-layer chlorophyll *a* concentrations were >8 and >13 mg/m^3, and were associated with silicate, nitrate and phosphate depletions (<2.0, <11.0 and 1.0 mmol/m^3 respectively), and nitrite and ammonium enhancement (>0.3 and >1.4 mmol/m^3 respectively). One of the phytoplankton blooms was associated with the nearby PF, but the origin of a bloom further south, well within the Antarctic Zone, was not clear. Phytoplankton production predicted by nutrient drawndown was far greater than the observed biomass on both surveys. (Auth. mod.)

J-56229

McPhee, M.G., **Turbulent oceanic heat flux during winter in the central Weddell Sea,** Conference on Polar Meteorology and Oceanography, 4th, Dallas, TX, Jan. 15-20, 1995. Preprints, Boston, American Meteorological Society, 1995, p.214-217, 7 refs.

During July and Aug. of 1994, the Antarctic Zone Flux Experiment (ANZFLUX) was executed from the National Science Foundation research icebreaker *Nathaniel B. Palmer,* in the Weddell Sea. The main thrust of the experiment was measuring fluxes of momentum, heat, salt and other properties in the upper ocean in at least two locations in the cyclonic gyre that dominates the circulation of the central Weddell. Understanding what maintains the present wintertime flux regime in the Weddell may be an important link in tracing how the abyssal ocean interacts with the rest of the climate system.

J-56254

Alvarez de Meneses, A., Escanez, J.E., **Study of some oceanographic parameters from the "Antártida 8611" expedition** [Estudio de algunos parámetros oceanográficos de la campaña Antártida 8611], IV Seminario de Química Marina. Cádiz, Jan. 28-29, 1988. Edited by A. Gómez Parra and J. López Ruiz, Cádiz, Universidad de Cádiz, 1988, p.159-168, In Spanish with English summary. 10 refs.

DLC GC10.S46a.4 1988

During the austral summer (Nov. 1986-Feb. 1987), the cruise "Antártida 8611" was carried out in the Scotia Sea and Brandfield Strait. Fifty deep-sampling hydrographic stations were studied for different physico-chemical parameters and dissolved micronutrients down to 500 m depth. Some additional hydrographic data from areas such as Shag Rocks, South Georgia, South Sandwich Is., South Orkneys Is. and Deception I. are given. (Auth. mod.)

J-56280

Savidge, G., et al, **Assessment of the role of the marginal ice zone in the carbon cycle of the Southern Ocean,** *Antarctic science,* Dec. 1996, 8(4), p.349-358, Refs. p.357-358.

The dense phytoplankton blooms observed in earlier studies in the southern ocean Marginal Ice Zone (MIZ) may not be representative of all regions, so that some previous assessments of the overall importance of this system in total primary production may have been overestimated. Recent observations have shown that increased phytoplankton production may not always be associated with the retreating ice-edge, due to the unpredictability of meltwater-induced stability. Complex interactions between the MIZ and hydrographic fronts have also been indicated. A range of simple simulations, based on biomass inventories for the major biogeochemical systems in the southern ocean, show that the greater part of chlorophyll biomass is located in the extensive regions between the major fronts. Consideration of the fronts and the MIZ only, which the authors surmize may be the principal sites of export production, indicates that the MIZ is clearly the most important single feature. Even if the occurrence of MIZ blooms in the simulations is reduced dramatically, such blooms still appear to make a substantial contribution to production and, by implication, carbon export. (Auth.)

J-56282

Piola, A.R., Grasselli, M.B., **Medium-scale heat fluxes across the Antarctic Circumpolar Current in the Drake Passage and western Scotia Sea,** *Antarctic science,* Dec. 1996, 8(4), p.369-378, Refs. p.377-378.

Closely spaced continuous temperature profiles from expendable bathythermographs launched along two sections across the Drake Passage and western Scotia Sea in the summer 1981-82 are used to examine the vertical medium-scale (ca. 10-100 m) temperature fine structure. The large-scale temperature structure across the frontal regimes characteristic of the Antarctic Circumpolar Current and the cross-frontal structure of the upper ocean are discussed. In the Drake Passage the heat content drops about 0.5×10^2 Kcal/cm^2 across the Subantarctic Zone and 0.9×10^2 Kcal/cm^2 across the Polar Front. In the Scotia Sea the heat content changes across the front are not as prominent. The statistical model of Joyce (1977) is used to quantify the heat fluxes across the fronts produced by the medium-scale temperature interleaving. The medium-scale fine structure heat fluxes are about 10% of the existing estimates of the mesoscale eddy heat fluxes and comparable to heat fluxes associated with the meridional flow of deep and bottom waters across the Antarctic Circumpolar Current. (Auth. mod.)

J-56291

Hay, W.W., **Tectonics and climate,** *Geologische Rundschau,* Sep. 1996, 85(3), p.409-437, Refs. p.433-437.

Global tectonics and climate are both directly and indirectly related. The direct connection is between uplift, atmospheric circulation, and the hydrologic cycle. The indirect links are via subduction, volcanism, the introduction of gasses into the atmosphere, and through erosion and consumption of atmospheric gases by chemical weathering. An example of the tectonic influences on ocean circulation is given by reference to subantarctic Drake Passage. (Auth. mod.)

J-56293

Frank, M., Gersonde, R., van der Loeff, M.R., Kuhn, G., Mangini, A., **Late Quaternary sediment dating and quantification of lateral sediment redistribution applying $^{230}\mathrm{Th}_{ex}$: a study from the eastern Atlantic sector of the southern ocean,** *Geologische Rundschau,* Sep. 1996, 85(3), p.554-566, 39 refs.

High-resolution records of the natural radionuclide ^{230}Th were measured in sediments from the eastern Atlantic sector of the Antarctic Circumpolar Current to obtain a detailed reconstruction of the sedimentation history of this key area for global climate change during the late Quaternary. (Auth. mod.)

J-56324

Fedulov, P.P., IAkovlev, V.N., **Anomalies of hydrometeorological conditions in the South Atlantic Ocean** [Anomalii gidrometeorologicheskikh usloviĭ v atlanticheskom sektore IUzhnogo okeana], *Rybnoe khoziaĭstvo,* Feb. 1986, No.2, p.19-21, In Russian.

DLC SH1.R8 1986

Investigations carried out during the summer of 1983-1984, confirmed that hydrometeorological anomalies influence seasonal processes of pelagic biocenoses. In contrast to excessively cold conditions prevailing during the previous 30 years, the occurrence of higher water temperatures was recorded around South Georgia and the South Sandwich Is. during the study period. Concurrently, an increase in the duration of phytoplankton autumn maximum development was observed.

J-56342

Le Provost, C., **Rosame: sea-level observation network in antarctic and subantarctic areas** [Rosame: le réseau d'observations subantarctiques et antarctiques du niveau de la mer], Institut Français pour la Recherche et la Technologie Polaires. Rapport d'activité: Année 1995 et campagnes d'été 95-69 (French Institute for Polar Research and Technology. Activity report for 1995 and the summer of 1995-1996), Plouzané, France, IFRTP, 1996, p.30-34, In French. 8 refs.

Details are provided on programs, including the World Ocean Circulation Experiment, and on instruments used in sea-level observations on French antarctic and subantarctic bases. Maps and charts of locations of the measuring stations and of sea level variations and other data are presented.

See also:
A-55203 A-55212 A-55436 A-55507 A-55839 A-55888 B-54063
B-54110 B-54124 B-54131 B-54155 B-54192 B-54198 B-54278
B-54279 B-54281 B-54387 B-54393 B-54441 B-54459 B-54460
B-54464 B-54474 B-54563 B-54564 B-54568 B-54604 B-54650
B-54681 B-54685 B-54686 B-54687 B-54699 B-54705 B-54706
B-54708 B-54709 B-54736 B-54816 B-54836 B-54896 B-54903
B-54904 B-54953 B-54965 B-55047 B-55108 B-55109 B-55189
B-55194 B-55213 B-55310 B-55313 B-55349 B-55448 B-55449
B-55450 B-55453 B-55454 B-55461 B-55466 B-55467 B-55594
B-55730 B-55731 B-55732 B-55735 B-55741 B-55744 B-55745
B-55777 B-55844 B-55961 B-55964 B-55973 B-55974 B-55979
B-55980 B-55982 B-56034 B-56035 B-56036 B-56105 B-56106
B-56107 B-56108 B-56109 B-56110 B-56123 B-56124 B-56126
B-56183 B-56184 B-56188 B-56257 B-56300 C-55430 E-54151
E-54631 E-54768 E-54949 E-55679 E-56049 E-56182 F-54060
F-54061 F-54062 F-54128 F-54149 F-54150 F-54152 F-54163
F-54242 F-54257 F-54305 F-54347 F-54479 F-54561 F-54653
F-55054 F-55114 F-55170 F-55214 F-55217 F-55220 F-55540
F-55625 F-55868 F-55869 F-55873 F-55956 F-55957 F-56003
F-56045 F-56059 F-56063 F-56064 F-56065 F-56067 F-56070
F-56072 F-56078 F-56121 F-56122 F-56133 F-56139 F-56252

G-54233 G-54703 G-54868 G-54886 G-55083 G-55341 I-54352
I-54392 I-54704 I-54790 I-54821 I-54822 I-54840 I-54849
I-54858 I-55065 I-55074 I-55219 I-55678 I-55683 I-55690
I-55724 I-55760 I-55849 I-55851 I-55903 I-55952 I-56212
I-56222 I-56228 I-56233 I-56238 I-56307 L-54602

K. ATMOSPHERIC PHYSICS

K-54116

Pallam Raju, D., Sridharan, R., Narayanan, R., Modi, N.K., Raghavarao, R., Subbaraya, B.H., **Ground-based optical observations of daytime auroral emissions from Antarctica,** *Journal of atmospheric and terrestrial physics,* Nov. 1995, 57(13), p.1591-1597, 14 refs.

First results obtained from ground-based observations on daytime auroral emission intensities from Maitri Station are presented and discussed. These results show striking increases in intensities in all the emissions (viz. low- and high-energy electron-induced and proton-induced emissions) during noon hours in a latitudinal region near the plasmapause and far from the conventional cusp zone. Wave-like disturbances are seen on moderately disturbed days in proton-induced emissions. Plausible causes for such enhancements and disturbances are discussed. (Auth.)

K-54117

Jarvis, M.J., **First Dynasonde observations of F-region plasma flow at Halley, Antarctica,** *Journal of atmospheric and terrestrial physics,* Nov. 1995, 57(13), p.1611-1622, 28 refs.

Plasma flow vectors have been derived from data recorded by the Advanced Ionospheric Sounder (operating as a Dynasonde) at Halley Station. Single bulk flow vectors derived from the motion of echo reflection surfaces in the overhead F-region ionosphere are consistent both with plasma flow vectors poleward of Halley, observed simultaneously by the PACE HF radar and also for various levels of geomagnetic activity, with published mean plasma flow at the same invariant geomagnetic latitude. The results demonstrate application of the method and lend support to existing evidence that the velocity measured by this kind of technique, at least for moderate to active geomagnetic activity at high latitudes, represents ionospheric plasma flow. (Auth. mod.)

K-54120

Burns, G.B., Hesse, M.H., Parcell, S.K., Malachowski, S., Cole, K.D., **Geoelectric field at Davis station, Antarctica,** *Journal of atmospheric and terrestrial physics,* Dec. 1995, 57(14), p.1783-1797, 6 refs.

An electric field mill is used to measure the vertical component of the geoelectric field at Davis Station. Local influences on the measurements are determined. Approximately a year of data is subjectively examined to determine periods when the fair-weather electric field is expected to be dominant. Using a cumulation of consecutive differences method, small intervals of data are combined to determine winter, spring and autumn diurnal fair-weather electric field curves. The seasonal-diurnal curves each show a peak between 19 UT and 22 UT that is similar in temporal location and relative magnitude to the global, fair-weather, seasonal diurnal curves. (Auth. mod.)

K-54121

Nakagawa, M., et al, **Observation of cosmic rays and auroral X-rays in the Polar Patrol Balloon Experiment,** *Advances in space research,* May 1996, 17(9), COSPAR Panel on Technical Problems Related to Scientific Ballooning, Meeting, Hamburg, Germany, July, 1994. Proceedings, p.(9)111-(9)114, 5 refs.

The Polar Patrol Balloon, aimed at studying the elemental and isotopic composition of galactic cosmic rays, solar energetic particles, cosmic gamma ray bursts and auroral X-rays was launched from Showa Station by the 34th Japanese Antarctic Research Expedition on Jan. 5, 1993. The balloon moved westward by 1.5 circumpolar rounds over Antarctica covering 6-13 g/cm^2 atmospheric depth and 63°S-70°S geographic latitude. A total of 584 hours of observations was obtained. The balloon trajectory, the observing system and preliminary results of spectra and global distribution of cosmic radiation and auroral X-rays are described. (Auth. mod.)

K-54166

Khodzha-Akhmedov, Ch.L., **Organization of regional forecasting services using oblique sounding of the ionosphere** [Organizatsiia regional'noĭ prognosticheskoĭ sluzhby s ispol'zovaniem naklonnogo zondirovaniia ionosfery], *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1991, Vol.427, p.6-14, In Russian. 5 refs.

General principles of the organization of forecasting centers are examined. Regional forecasting centers and the areas they serve are presented, including Molodezhnaya Station, which serves the entire antarctic region. Forecasts, compiled by the centers and based on data obtained from observation stations, are described. (Auth. mod.)

K-54167

Vovk, V.IA., **Diagnostics of the polar ionosphere using oblique and reverse-oblique sounding** [Diagnostika poliarnoĭ ionosfery metodom naklonnogo i vozvratno-naklonnogo zondirovaniia], *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1991, Vol.427, p.49-53, In Russian. 7 refs.

The effect of the nonhomogeneity of electron concentration on the characteristics of the signal of the subauroral line of oblique sounding was studied, using ray paths. It was shown that the transfer of nonhomogeneity along the path leads to the change of the remote frequency response during oblique sounding. The Leningradskaya-Molodezhnaya and Vostok-Molodezhnaya lines were used in the study. (Auth mod.)

K-54168

Vovk, V.IA., **Evaluation of ionospheric inhomogeneities using reverse-oblique sounding** [Diagnostika ionosfernykh neodnorodnosteĭ metodom VNZ], *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1991, Vol.427, p.54-64, In Russian. 8 refs.

Studies of the ionosphere in the region of the auroral zone and the polar cap in Antarctica were conducted, using reverse-oblique sounding. Problems in interpreting the remote frequency characteristic of reverse-oblique sounding were examined. The Vostok-Molodezhnaya and Molodezhnaya-Leningradskaya lines were used in the study. (Auth. mod.)

K-54169

Khodzha-Akhmedov, Ch.L., Kozlov, A.I., **Spectral deviations of HF signals on antarctic radio lines and their association with the state of the ionosphere** [Spektral'nye iskazheniia KV signalov na antarkticheskikh radioliniiakh i ikh sviaz's sostoianiem ionosfery], *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-issledovatel'skiĭ institut. Trudy,* 1991, Vol.427, p.107-123, In Russian. 13 refs.

Results from the study of spectral deviations of HF signals on radio lines of varying length and orientation are presented. It is shown that the maximum distortion of spectra takes place at the equinox as well as along routes passing through the polar cap. The results are explained by the rules of movement for nonhomogeneities and the dispersion of radio signals in the ionosphere. (Auth. mod.)

K-54170

Besprozvannaia, A.S., Vovk, V.IA., Eliseev, A.M., Moskvin, I.V., Khodzha-Akhmedov, Ch.L., **Comparison of the experimental and estimated values of the highest usable frequency on the Bellingshausen-Molodezhnaya path under winter conditions** [Sopostavlenie eksperimental'nykh i raschetnykh znacheniĭ MPCh na trasse Bellinsgauzen-Molodezhnaia dlia zimnikh usloviĭ], *St. Petersburg. Arkticheskiĭ i antarkticheskiĭ nauchno-*

issledovatel'skiĭ institut. Trudy, 1991, Vol.427, p.139-143, In Russian. 7 refs.

The results from the comparison of experimental and estimated values of the highest usable frequency over the Bellingshausen-Molodezhnaya path are presented. The estimation was carried out with the refraction integral method using an adapted standard global model of the ionosphere. It is shown that for the greater part of the day, the estimated and experimental values of the highest usable frequency coincide. (Auth. mod.)

K-54203

Burns, G.B., ed, Duldig, M.L., ed, **Australian upper atmospheric and space physics research in Antarctica, 1992,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, 317p., Refs. passim. For selected papers see K-54204 through K-54230.

DLC QC869.4.A6A95

The papers in this collection were presented at the Tenth National Congress of the Australian Institute of Physics held at Melbourne University, Victoria between Feb. 10 and 14, 1992. This anthology consists of papers the authors considered relevant to Australian antarctic research which were presented in sessions on Solar-Terrestrial and Space Physics. The majority of the papers are preliminary and are intended as an indication of some of the current directions of Australian upper atmospheric and space physics research in Antarctica. It is anticipated that final results will appear in appropriate journals.

K-54204

Hansen, H.J., Fraser, B.J., Menk, F.W., Morris, R.J., **ULF magnetic pulsation studies in Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.3-8, 15 refs.

DLC QC869.4.A6A95

The complete spectrum of ULF waves, from ion cyclotron waves (f=few Hz) down to hydromagnetic and other waves with periods of minutes, plays an important role in dissipating energy involved in the solar terrestrial interaction. These waves cause oscillations in the ionospheric current systems and ground-based magnetometers are sensitive to the magnetic field variations associated with these perturbations. The Space Plasma Waves Group at Newcastle University in conjunction with the Antarctic Division operates an antarctic network of induction magnetometers in order to study these processes. This review presents an overview of these activities. (Auth.)

K-54205

Fraser, B.J., **U.S. National Science Foundation's Geospace Environmental Modelling (GEM) Program, 1990-1995,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.9-12, 7 refs.

DLC QC869.4.A6A95

The Geospace Environment Modelling Program (GEM) is an NSF initiative to produce a comprehensive model of the interactions of the solar wind with the earth's magnetosphere and ionosphere. The scientific goal of GEM is to understand the solar-terrestrial system well enough to be able to formulate a mathematical framework that can predict the deterministic properties of geospace ('weather in space') and the statistical characteristics of its stochastic properties ('climate in space'). The approach taken was to identify the problems requiring solution and place these in a framework that would be most likely to produce the global geospace circulation model. As a consequence the program consists of a series of overlapping and integrated efforts to address predetermined problems which are supported by a synchronized series of both theory and observational campaigns. Important input to the GEM program is provided by the Australian antarctic upper atmosphere research program. (Auth. mod.)

K-54206

Morris, R.J., Cole, K.D., Troitskaia, V.A., Fraser, B.J., Hansen, H.J., Menk, F.W., **Multi-site high-latitude ULF magnetic pulsation studies,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.13-18, 15 refs.

DLC QC869.4.A6A95

A case study of Pc1-2 and Pc3 magnetic pulsation events, recorded on the Australian antarctic and subantarctic digital array of induction magnetometers, is presented. The database comprised three fortnightly digital campaigns conducted during the 1990 austral winter and the 1991 austral summer, respectively. The summer campaign was augmented by a traverse which supported the operation of a field induction magnetometer at Law Dome, some 130 km inland from Casey. The ULF waves presented appear to maximize in occurrence frequency and amplitude under the projection of the dayside polar cusp and polar cleft. The propagation characteristics of these emissions over the widely spaced array (Inv. 64-80.6°S) are reported. The study focuses on whether aspects of the reported high-latitude magnetic pulsation events and their reported propagation characteristics provide a ground diagnostic for estimating the location of the projection of the polar cusp and adjacent magnetospheric regions. (Auth.)

K-54207

Dunlop, I.S., Menk, F.W., Hansen, H.J., Fraser, B.J., Morris, R.J., **Multistation study of long period geomagnetic pulsations in the polar cleft and cusp,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.29-41, 19 refs.

DLC QC869.4.A6A95

Long period ($1<f<15$ mHz) geomagnetic pulsations recorded at 4 Australian antarctic stations and the New Zealand station Scott Base have been examined in order to identify wave characteristics associated with different generation mechanisms and magnetospheric source regions. Three distinct wave types were found. First, sustained quasi-sinusoidal oscillations recorded for several hours around local noon at boundary layer latitudes are most likely explained by the excitation of field line resonances by the Kelvin-Helmholtz instability. Second, irregular pulsations (IPCL) are found near local noon at cusp latitudes, but are not necessarily a cusp indicator. Finally, short bursts from one to a few cycles duration are observed both poleward and equatorward of the cusp during local daytime. Where these emissions are observed at only one station they may be signatures of magnetospheric flux transfer events (FTE). Their occasional observation simultaneously at several stations is suggestive of global impulsive compressions of the geomagnetic cavity. (Auth.)

K-54208

Hansen, H.J., Fraser, B.J., Menk, F.W., Newell, P.T., Meng, C.I., Morris, R.J., **Sources of solar wind associated Pc3-5 magnetic pulsations in the magnetosphere,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.42-48, 8 refs.

DLC QC869.4.A6A95

Dayside Pc3-5 (30-70 mHz) magnetic pulsations were recorded during a 14-day campaign in Apr. 1990 with a three station array of induction magnetometers in Antarctica spanning 70-80°S MLAT and almost five hours in local time. During two intervals when it was possible to associate these pulsation signals with the solar wind upstream of the bow shock, interstation cross-spectral and polarization analysis shows the waves enter via two regions simultaneously. One is situated in the pre-noon local time sector in the sun-earth reference frame where bow shock turbulence peaks near the nose of the magnetosphere. The other is most likely along the magnetospheric boundary plasmasheet region which maps down to the dayside auroral region. (Auth.)

K-54209

Hansen, H.J., Fraser, B.J., Menk, F.W., Erlandson, R.E., **Ground-satellite observations of high latitude Pc1-2 pulsations,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.74-81, 18 refs.

DLC QC869.4.A6A95

During 1986 the Viking polar orbiting satellite identified 21 intervals of high latitude Pc1 (0.2-5 Hz) activity from 59-77° MLAT above the Northern Hemisphere. This paper presents an analysis of concurrent Pc1 activity recorded at Mawson Station where similar activity was found on 7 occasions when Viking was located essentially conjugate. As ion cyclotron waves are considered to be responsible for the Viking observations, the analysis of this associated Mawson activity contributes towards understanding how ion cyclotron wave energy is transmitted from the high latitude equatorial magnetosphere to the ground. Consequently, this study elucidates the relationship between the frequency changes of Pc1 waves observed at Mawson and the morphology and dynamics of magnetospheric ion cyclotron wave generation regions responsible for this activity. (Auth.)

K-54210

Francke, M.H., Hansen, H.J., Menk, F.W., Fraser, B.J., Morris, R.J., **Propagation of Pc1 magnetic bursts across the polar cap region,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.82-88, 13 refs.

DLC QC869.4.A6A95

Pc1 (0.2-5 Hz) magnetic pulsations were recorded during a 14-day campaign in July 1990 using a ground array of induction magnetometers in the Australian Antarctic Territory. This paper is concerned with the analysis of the spatial characteristics of discrete Pc1 bursts or packets, often recorded in association with solitary magnetic impulses (period=1 to 10 min). Interstation cross-spectral analysis of these Pc1 events allows their phase velocities to be determined and their ionospheric attenuation to be studied. The ionospheric source of high latitude Pc1 signals has previously been interpreted in terms of the arrival at the ionosphere of magnetospheric ion cyclotron waves. These results thus relate to the dissipation and propagation of magnetospheric ion cyclotron wave energy in the ionosphere. (Auth.)

K-54211

Li, Y., Webster, D.J., Menk, F.W., Fraser, B.J., **Generation and propagation mechanisms of Pi2 geomagnetic pulsations,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.89-98, 11 refs.

DLC QC869.4.A6A95

Impulsive transient geomagnetic pulsations in the 5-25 mHz range (Pi2) at auroral latitudes accompany the onset of geomagnetic substorms. They can also be recorded at low latitudes, although how the signals propagate to these regions is unknown. In this study Pi2 events recorded across an induction and fluxgate magnetometer array from L=5.3 (Macquarie I.) to L=1.44 (Gladstone, Qld), and Auckland, New Zealand, are examined. Wave spectra, latitudinal amplitude distribution, phase and polarization characteristics are obtained using pure state analysis techniques. These results imply that low-latitude Pi2 are associated with distinctly different generation and propagation mechanisms than those at high latitudes. (Auth.)

K-54212

Burns, G.B., Beggs, H.M., **Magnetic time for Australia's antarctic stations,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.99-111, 6 refs.

DLC QC869.4.A6A95

Magnetic models and the concept of magnetic time are briefly reviewed. The average annual Universal Time (UT) time of magnetic noon and magnetic midnight are given for the four ANARE stations, for the PGM system. Minimum and maximum annual values are also listed. Diurnal variations in the difference between UT and Magnetic Local Time (MLT) for selected days are plotted. (Auth. mod.)

K-54213

Greet, P.A., Jacka, F., **Analysis of high-resolution mesospheric sodium twilight spectral emission profiles,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.112-116, 2 refs.

DLC QC869.4.A6A95

High-resolution Fabry-Perot spectrometers have been used for observations of mesospheric sodium spectral emissions excited by resonant scattering of sunlight. These observations are used to estimate winds and temperatures in the emission region. To extract wind estimates from the Doppler shift of sky emissions, hollow-cathode tubes have been used to define the rest wavelength of the emission. Careful analysis of both tube and sky spectra show the presence of self-absorption. The nature of the absorption is different for tube and sky profiles; in the former case absorption occurs after emission, and in the latter absorption occurs in the incident radiation prior to emission. There is a further complication in the latter case, viz. the Doppler shift of the absorption is determined by the wind component in the direction of the sun while the Doppler shift of the emission is determined by the wind component in the direction of viewing. The effects of these absorption processes on wind and temperature estimates are discussed. (Auth.)

K-54214

Klekociuk, A.R., Burns, G.B., **O(^{1}S) excitation and effective lifetimes,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.117-129, 13 refs.

DLC QC869.4.A6A95

Intensity time-series with a 0.05 s time resolution were obtained for the 428 nm N_2^+ (1NG) band and 558 nm O(^{1}S) line emissions during intervals of rapidly fluctuating auroral intensities at Macquarie I. during 1988. Similar measurements have been used by previous workers to infer the effective lifetimes of the O(^{1}S) state and the existence of, and percentage contribution from, an indirect excitation process. The method the authors introduce allows determination of an upper limit for the mis-interpretation as an indirect process of nonlinearities known to exist between the 428 nm N_2^+ (1NG) band and 558 nm O(^{1}S) line emissions. These nonlinearities have been ignored in previous investigations of O(^{1}S) excitation processes. (Auth. mod.)

K-54215

Craven, M., Burns, G.B., Klekociuk, A.R., McEwen, D.J., **Inferring auroral energies,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.130-142, 14 refs.

DLC QC869.4.A6A95

A program was undertaken at Mawson Station during the 1991 austral winter to infer auroral electron energies from ground-based optical and cosmic noise absorption measurements. Energies inferred from these measurements will be compared with those recorded *in situ* by DMSP satellites crossing the observed region of interest. By comparing absorption levels with optical intensities it is hoped to extend to high energies the range for which this ground-based method can be used. By using the satellite particle data it is intended to establish some limits on the variability inherent in using instruments with wide fields-of-view for inferring auroral energies. (Auth. mod.)

K-54216

Beggs, H.M., Essex, E.A., Rasch, D.J., **Antarctic polar cap total electron content observations using a differential phase technique at Casey Station,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.143-154, 16 refs.

DLC QC869.4.A6A95

In early 1990 a modified JMR-1 satellite receiver system was installed at Casey Station in order to monitor the differential phase between the 150 MHz and 400 MHz signals from polar orbiting NNSS satellites. Total electron content (TEC) was calculated using the differential phase and Casey ionosonde foF2 data, and is presented here for near sunspot maximum in Aug. 1990 and exactly one year later. The data are used to investigate long-lived ionization enhancements at invariant latitudes polewards of -80°Λ, and the 'polar hole', a region from -70° to -80°Λ on the nightside of the polar cap where reduced electron density exists because of the long transport time of plasma from the dayside across the polar cap. A comparison is made between the Casey TEC data and the Utah State University Time Dependent Ionospheric Model (TDIM) which uses as variables the solar index (F10.7), season (summer, winter or equinox), global magnetic index (Kp), IMF B_y direction, and universal time (UT). (Auth.)

K-54217

Rasch, D.J., Essex, E.A., **Quasi periodic scintillation events at southern auroral latitudes,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.155-164, 27 refs.

DLC QC869.4.A6A95

Quasi-periodic (QP) radio scintillations were observed during 1987 in the southern auroral zone, on 244 MHz and 1.5 GHz geostationary satellite transmissions, from Davis Station. The substantial loss of signal associated with these events may be an important factor in determining the reliability of satellite links in auroral regions. Three distinct types of QP events were identified, two of which could be adequately described by existing models involving the passage across the raypath of a narrow, highly ionized or highly depleted column irregularity. A third type of event observed on 244 MHz could be modelled by the passage of an opaque column irregularity which also supported a reflected ray at grazing incidence. The dominant occurrence time for QP events on both frequencies was 18-00 hours MLT. At these times, the raypath may intersect the poleward edge of the trough where sporadic-E or low F-region tilted structures may be produced by the passage of medium-scale acoustic gravity waves. (Auth. mod.)

K-54218

Hesse, M.H., Burns, G.B., Malachowski, S., **Ground based electric field measurements at Davis Station, Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.165-179, 2 refs.

DLC QC869.4.A6A95

An electric field mill has been used to measure the vertical component of the earth's electric field at Davis Station since Mar. 1988. Comparisons of electric field values with a range of simultaneously recorded meteorological data are used to determine the magnitude and variability of local influences at the Davis site. Dependences on wind speed, wind direction and airborne snow are demonstrated. The relationship between the electric field values and the wind speed is shown to be loosely dependent on the level of the relative humidity. Approximately one year's data (July 8, 1989 to July 10, 1990) is subjectively examined to determine periods when the 'fair weather' electric field is expected to be dominant. From this 'fair weather' data set, diurnal electric field curves are obtained for the four seasons. The data set is also examined for evidence of further contamination from local sources. (Auth. mod.)

K-54219

Von Biel, H.A., **Ionisation below 55 km in the antarctic mesosphere,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.180-190, 12 refs.

DLC QC869.4.A6A95

The characteristics of a thin layer of ionization, occasionally observable during the antarctic summer months at heights between 40 km and 55 km, are described. The results presented pertain to data collected over five consecutive years since 1987 from a 2.9 MHz partial reflection program operated at Scott Base. The maximum density of the layer is most frequently found to be in the vicinity of 600/cm^3, which is sufficiently low to rule out ionization by energetic protons, while photo-ionization would produce a layer of nearly twice the observed thickness of about 12 km. It is shown that ionization by relativistic electrons might well account for the production of this ionization. (Auth.)

K-54220

Burns, G.B., Partridge, D.J., **Time constants of the D-region,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.191-201, 4 refs.

DLC QC869.4.A6A95

A fast response riometer with a 5 MHz bandwidth and a resolution of 0.02 dB was used to measure cosmic noise absorption (CNA) pulsations during a pulsating aurora event at Macquarie I. Comparisons of the CNA pulsations with optical intensities of the N_2^+ 1NG (0, 1) band were used to infer 'ionospheric time constants' in the range 2-10 s. Using reasonable approximations to the altitude and width of the absorption layer, and some recently published measurements of the effective recombination rate and specific absorption (dB/km per electron density), an attempt was made to balance the measurements of total absorption and the inferred time constants. The varying results obtained are most likely related to variations in the average energy of the precipitating auroral electrons (and thus variations in the altitude of the absorption layer) during the event. By incorporating a means of estimating the average and total energy of the incident auroral particles, the method of analysis used here may provide a means to measure the height profile and seasonal variation of the D-region effective recombination coefficient. (Auth. mod.)

K-54221

Duldig, M.L., Humble, J.E., Bendoricchio, M.B.M., **Unprecedented sequence of ground level enhancements during the recent solar maximum,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.207-224, 12 refs.

DLC QC869.4.A6A95

An unprecedented sequence of Ground Level Enhancements (GLE) was observed world-wide during the recent solar maximum including the largest such event (Sep. 29, 1989) since 1956. An introduction to the ground based detection of low energy cosmic rays is presented. Features of a number of recent GLE are presented with emphasis on the large Sep. 29, 1989 event and improved modelling of the Oct. 22, 1989 event. GLE data from several antarctic locations are included. (Auth. mod.)

K-54222

Cramp, J.L., Duldig, M.L., Humble, J.E., **Cosmic ray diurnal variation near the heliospheric current sheet,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.225-243, 11 refs.

DLC QC869.4.A6A95

The proximity of the Heliospheric Current Sheet (HCS) may affect the modulation of cosmic rays. Duldig and Humble (1990) have previously reported that during many periods of enhanced diurnal variation (DV) at least one sector boundary crossing occurred. Here the authors investigate the variations in the DV with changing distance between the HCS and the earth. They use both 1D and 3D models to estimate the HCS distance. Significant correlations have been found with the 1D model. The results and models are discussed. Test sites include Mawson Station. (Auth. mod.)

K-54223

Baker, C.P., Humble, J.E., Duldig, M.L., **Heliospheric modulation models of high-energy cosmic rays: theory vs observation at 1 AU,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.244-263, Refs. p.260-262.

DLC QC869.4.A6A95

The intensity of galactic cosmic rays in the solar system can be determined theoretically by solving the standard cosmic ray transport equation. Numerical solutions are presented for cosmic rays in the energy range 10^9 to 10^{10} eV. Comparisons are made between the calculated radial gradient of cosmic rays at earth and that inferred by terrestrial based neutron monitors. This comparison shows a discrepancy between theory and observation by up to a factor of 5. The radial gradient is inferred from observations of the 'north/south anisotropy'. A method of observing this anisotropy at these and slightly higher energies, and inferring the radial gradient using the cosmic ray detectors at Mawson Station, is given. Possible inadequacies of the model are also discussed. (Auth.)

K-54224

Hall, D.L., Duldig, M.L., Humble, J.E., **Comparative study of solar modulation processes as recorded by southern latitude cosmic ray telescopes,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.264-278, 23 refs.

DLC QC869.4.A6A95

In a effort to obtain a greater understanding of the magnetic structure of the heliosphere and the associated mechanisms responsible for the modulation of high energy cosmic ray particles, the solar anisotropies measured at a number of southern observatories will be studied. Specifically, long-term variations over solar magnetic cycles in the anisotropies measured by underground and surface muon telescopes and neutron monitors will be studied and results from different latitude stations and energy ranges compared. Also, long-term variations in the absolute intensity of cosmic rays will be studied as another related modulation. An introduction to this research project is presented. Data from Mawson Station are included. (Auth.)

K-54225

Gillingham, P.R., **Antarctic astronomy—introduction and summary of international developments affecting Australia,** *Australian National Antarctic Research Expeditions. ANARE* *research notes,* Nov. 1992, No.88, p.285-289, 5 refs.

DLC QC869.4.A6A95

The extremely dry and cold atmosphere above the highest part of the antarctic plateau presents opportunities for astronomical observations at infrared (IR) and mm wavelengths substantially better than from anywhere else on earth. Contrary to the popular concept of Antarctica, the climate high on the plateau features low wind speeds, mostly clear skies and relatively little snowfall. Many nations have already done astronomical work in Antarctica, some producing very good science, and in the last few years there has been a substantial quickening of interest. Several US institutions have collaborated to set up a Center for Astrophysical Research in Antarctica and this group has plans for greatly increasing the power of IR and mm instruments at South Pole. A new international observatory sited for optimum astronomical performance has also been proposed. Australian and French astronomers, meeting in 1991 to discuss future collaboration, placed developments in Antarctica as their highest priority and a follow-up meeting on this topic will be held in 1992. At its triennial General Assembly in 1991, the International Astronomical Union adopted a resolution urging the establishment of an international high altitude observatory in Antarctica and set up a Working Group to encourage this. (Auth.)

K-54226

Gillingham, P.R., **Super seeing from the Australian Antarctic Territory?,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.290-292, 4 refs.

DLC QC869.4.A6A95

In seeing, the degradation of resolution due to the earth's atmosphere is a crucial factor in determining the performance of ground-based telescopes. This degradation is predominantly the result of thermal inhomogeneity of the air, to which a substantial contribution arises from the diurnal cycle of solar heating. In most of Antarctica the diurnal variation in temperature is negligible throughout winter, so good seeing can be expected on this account. Above the highest point of the antarctic plateau the predominant air flow is a slow settling from the stratosphere which should promote extraordinarily uniform optical quality. Unfortunately, the lower boundary layer in which a strong inverse temperature gradient develops, especially in winter, is often likely to degrade what might otherwise be unprecedented seeing. Critical tests are needed to measure this degradation and determine whether it can be circumvented by mounting a telescope on a higher pier than usual. (Auth.)

K-54227

Burton, M.G., Allen, D.A., McGregor, P.J., **Potential of near-infrared astronomy in Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.293-300, 4 refs.

DLC QC869.4.A6A95

The highest part of the antarctic plateau (Dome A) holds the promise of providing a superlative site for near-infrared (IR) astronomy, and in particular for observations in the 2.27-2.45 micron waveband. This is a result of the intense cold, which reduces the thermal background by 6 magnitudes compared to a mid-latitude site; the absence of OH airglow emission between these wavelengths, and the minimum in the zodiacal emission which occurs in the near-IR. The prospects exist for the darkest site for astronomy at any wavelength, anywhere in the inner solar system. Some possible scientific projects to exploit this potential, particularly deep cosmological surveys, are outlined. (Auth.)

K-54228

Smith, C.H., **Potential for mid-infrared astronomy from Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.301-308.

DLC QC869.4.A6A95

The antarctic plateau, with its very dry and cold atmosphere, presents a number of advantages for astronomy in the thermal infrared region. With atmospheric temperatures 60-80° below zero, the thermal background drops by a factor of 5, compared with the best currently available observatory sites (e.g. Mauna Kea). More importantly, however, the extremely low precipitable water vapor content in the antarctic atmosphere (200-600 microns) means that the accessible region of the spectrum extends virtually all the way to 60 microns, compared with the almost complete cutoff at 22 microns for currently available observing sites. While the potential gains are significant, there are also some potential drawbacks, such as ice 'haze'. It is essential that site testing begin as soon as possible to determine the reality of the benefits from siting a telescope in Antarctica. (Auth.)

K-54229

Storey, J.W.V., Hyland, A.R., **Far-infrared and sub-millimeter astronomy in Antarctica,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.309-313, 4 refs.

DLC QC869.4.A6A95

The wavelength range from 5 to 500 microns is one of the most technologically difficult for astronomers. For this reason, and also because of poor atmospheric transmission, the region has until recently been underexploited relative to, say, the radio and optical regions. To avoid the poor transmission and high emissivity of the atmosphere, astronomers have frequently resorted to balloons, stratospheric aircraft or even satellites to carry out the observations. The high altitude, extremely low temperatures and low humidity of the antarctic plateau combine to make it potentially the best site on earth for far-infrared and sub-mm astronomy. Indeed, at some wavelengths, it is the only place on earth from which ground-based astronomy is possible. This research note reviews the current status of antarctic astronomy in the far-infrared and sub-mm, and suggests potential areas for Australian involvement. (Auth.)

K-54230

Duldig, M.L., **Possible cosmic ray observations from a multi-national antarctic station on Dome A,** *Australian National Antarctic Research Expeditions. ANARE research notes,* Nov. 1992, No.88, p.314-317, 2 refs.

DLC QC869.4.A6A95

The proposal that a multi-national astrophysical observatory be established on the highest area of the antarctic ice plateau (Dome A) has centered on the opportunities for optical, infrared and sub-mm wave astronomy. Such a site could also be used to extend the world-wide cosmic ray observatory network. Suitable cosmic ray experiments for the site are considered. Additionally, possible geomagnetic and upper atmospheric physics measurements from such a site are briefly discussed.

K-54345

Alford, J., Engebretson, M., Arnoldy, R., Inan, U., **Frequency variations of quasi-periodic ELF-VLF emissions: a possible new ground-based diagnostic of the outer high-latitude magnetosphere,** *Journal of geophysical research,* Jan. 1, 1996, 101(A1), p.83-97, 32 refs.

This paper examines data from South Pole Station (L ≈ 14) to determine the occurrence and characteristics of quasi-periodic (QP) emissions. On the basis of 14 months of data during 1987 and 1988 QP emissions typically appeared in both the 0.5-1 kHz and 1-2 kHz receiver channels at South Pole and occasionally in the 2-4 kHz channel. The QP emission frequency appeared to depend on solar wind parameters and interplanetay magnetic field (IMF) direction, and the months near fall equinox in both 1987 and 1988 showed a significant increase in the percentage of QP emissions only in the lowest-frequency channel. A model consistent with these variations in which high-latitude (nonequatorial) magnetic field minima near the magnetopause play a major role is presented. Because the field in these regions will be strongly influenced by solar wind and IMF parameters, variations in the frequency of such emissions may be useful in providing ground-based diagnostics of the outer high-latitude magnetosphere. (Auth. mod.)

K-54396

Morrison, K., et al, **ULF modulation of ELF-VLF emissions close to the magnetospheric boundary,** Physical signatures of magnetospheric boundary layer processes, edited by J.A. Holtet and A. Egeland, Dordrecht, Kluwer Academic Publishers, 1994, p.375-381, Refs. p.380-381.

The spatial extent and temporal behavior of quasi-periodic (QP) intensity modulations of 0.5-2 kHz ELF-VLF emissions were investigated in a comparative study of data collected at three antarctic stations. Frequently, the waveforms of the ELF-VLF signals received at each site were identical. The emissions are identified with the periodic modulation of the electron pitch-angle distribution by the propagation of ULF compressional fast-mode waves through a region. In addition to generation close to the equatorial plane, the authors propose an additional high-latitude source of QP emissions. These emissions are associated with regions of minimum-*B* produced by the dayside compression of the magnetosphere close to the magnetopause. (Auth.)

K-54443

Engebretson, M.J., et al, **Optical evidence that modulated electron precipitation near the magnetosphere boundary drives high latitude Pc3-4 magnetic pulsations,** Physical signatures of magnetospheric boundary layer processes, edited by J.A. Holtet and A. Egeland. NATO ASI Series, C: Mathematical and Physical Sciences, Vol.425, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1994, p.361-373, 22 refs.

DLC QC809.M35P48 1994

South Pole Station is uniquely situated for studies of the high latitude winter ionosphere both because of the extended darkness its geographical location provides and because it is located near the nominal latitude of the foot of the dayside cusp/cleft region during periods of moderate geomagnetic activity. Simultaneous magnetic and optical signatures of Pc3-4 pulsations for 94 days during the 1990 austral winter were examined. The pulsation occurrences in both magnetic field and auroral light were closely linked, with narrowband optical pulsations occurring only when similarly narrowband Pc3-4 magnetic pulsations were also present. In addition, optical pulsations occurred only when the station was under the boundary layer or the outer magnetosphere. The data indicate that nearly all of the observed magnetic pulsations may be accompanied by modulated electron precipitation. The modulated electron flux inferred from the optical measurements was sufficient to produce the observed magnetic pulsations. (Auth.)

K-54482

Nakajima, T., Kamiyama, T., Fujii, Y., Motoyama, H., Esumi, S., **Ice-based altitude distribution of natural radiation annual exposure rate in the Antarctica zone over the latitude range 69S-77S using a pair-filter thermoluminescence method,** *Applied radiation and isotopes,* Dec. 1995, 46(12), p.1363-1368, 9 refs.

Both ice-based altitude distributions of natural ionizing radiation exposure and the quasi-effective energy of natural radiation over Antarctica over the latitude range 69-77°S during approx. 500 days were measured using thermoluminescence dosimeters. The results show that dependence on altitude above sea level of the exposure rate increases by almost three-fold with each 2000 m increase in altitude, thus deviating from the general rule stating that the exposure rate should double with each 2000 m. Although the exposure rate shows a dependence on altitude, altitude dependence of the quasi-effective energy of natural radiation over Antarctica was not observed. It was observed that natural radiation occurring over the ice base of Antarctica consists mainly of cosmic rays. (Auth.)

K-54488

Nunn, D., Smith, A.J., **Numerical simulation of whistler-triggered VLF emissions observed in Antarctica,** *Journal of geophysical research,* Mar. 1, 1996, 101(A3), p.5261-5277, 24 refs.

The British Antarctic Survey VLF database from Halley and Faraday stations has been searched for clear examples of whistler-triggered emissions (WTEs). Dominant events were the triggering of risers or quasi-constant frequency emissions from the upper arm of a whistler. A fairly frequent occurrence was the triggering of steep fallers from the whistler upper arm. At Faraday most WTE events were the triggering of long steep risers from the lower whistler arm. A VHS/VLF Vlasov hybrid simulation code was run and successfully simulated the main categories of WTE: risers and fallers off the upper arm and risers from the lower arm. Agreement with observations was generally good. The Vlasov code is highly efficient and well suited to this problem. (Auth. mod.)

K-54502

Steig, E.J., Polissar, P.J., Stuiver, M., Grootes, P.M., Finkel, R.C., **Large amplitude solar modulation cycles of ^{10}Be in Antarctica: implications for atmospheric mixing processes and interpretation of the ice core record,** *Geophysical research letters,* Mar. 1, 1996, 23(5), p.523-526, 40 refs.

Beryllium isotope (^{10}Be) concentrations in an ice core at Taylor Dome show greater variation over the last 75 years than similar ^{10}Be time-series from Greenland. Like the Greenland records, the new antarctic data exhibit a strong periodicity which follows expected changes in the production rate of ^{10}Be over the 11-year solar cycle. Noting that the amplitude of production-rate variation is both latitude and altitude dependent, the authors estimate the relative contribution of ^{10}Be from different atmospheric reservoirs. The calculations yield a relatively small (<35%) contribution from the low-to-midlatitude stratosphere, suggesting a weak coupling between antarctic ^{10}Be and geomagnetic field intensity. (Auth. mod.)

K-54584

Shen, C.S., Zi, M.Y., Schlegel, K., **Typical sample of ionospheric disturbance caused by magnetospheric convection,** *Antarctic research (Chinese edition),* 1995, 7(4), p.71-79, In Chinese with English summary. 8 refs.

Using data of EISCAT, f_0F2 from ionosondes at Zhongshan Station and a station chain in China, the authors analyze the ionospheric disturbances of May 2-3, 1991. The features representing processes of electrodynamic and dynamic coupling during a magnetic storm are carefully compared. Results show that in this sample, the disturbances are mainly caused by magnetospheric convection. Analysis of geomagnetic data from stations around the world indicates that the coupling mechanism discussed here is reasonable. (Auth.)

K-54598

Liu, C.F., Liu, C.J., Jiao, C.M., Wang, Y., **Quiet daily variations S_q of geomagnetic field at Zhongshan Station, Antarctica in 1991,** *Antarctic research (Chinese edition),* 1995, 7(3), p.81-88, In Chinese with English summary. 14 refs.

The geomagnetically quiet daily variations (S_q-field) are analyzed at Zhongshan Station during the period of maximum solar activity in 1991. The S_q-field consists of both the S_q^0-field and S_q^p-field. Amplitudes of variation are larger in summer than in winter. The S_q^0(H) variation appears in a twin-peak pattern in summer. S_q^0-field is mainly controlled by the higher latitudinal ionospheric S_q current system in the polar region. The morphology of S_q^p-field variability shows no difference between daytime and nighttime. The intensity of S_q^p-field variability is less in the winter than in the summer. The S_q^0(Z) variation is larger than the S_q^0(H) variation. In particular, the amplitude of S_q^0(Z) is twice as large as S_q^0(H) in winter. (Auth. mod.)

K-54761

Frichter, G.M., Ralston, J.P., McKay, D.W., **On radio detection of ultrahigh energy neutrinos in antarctic ice,** *Physical review D,* Feb. 1, 1996, 53(3), p.1684-1698, 35 refs.

Antarctic ice meets the requirements for an efficient detection medium for a radio frequency neutrino telescope. This paper estimates the sensitivity of realistic antennas embedded deep in the ice to 100 MHz-1 GHz signals generated by predicted neutrino fluxes from active galactic nuclei. The conclusion is that a single radio receiver can probe an ≈ 1 km^3 volume for events with primary energy near 2 PeV and that the total number of events registered would be roughly 200 to 400/yr in the most conservative estimate. An array of such receivers would increase sensitivity dramatically. A radio neutrino telescope could directly observe and test our understanding of the most powerful particle accelerators in the universe, simultaneously testing the standard theory of particle physics at unprecedented energies. (Auth. mod.)

K-54776

Viotti, R., **Antarctica as a center for astronomical observations** [L'Antartide come sede per osservazioni astronomiche], *Ambiente Antartide,* Dec. 1995, No.6, p.28-29, In Italian with English summary.

The point is made that sites such as Dome Charlie (3280 m), where environment conditions of extreme dryness, very low ambient temperatures, faint and laminar winds, low sky brightness, etc., are quite favorable for astronomic observations, key studies can be carried out which cannot be made elsewhere at ground level. Astronomy from the Antarctic Plateau might open new windows on the Universe in the mid- and far-infrared range which can now be observed only from high altitude air flights or satellites; it can carry out high quality observations at any wavelength range to highlight microphotometric phenomena related to stellar evolution, and it can allow systematic search of unpredictable phenomena in special fields, such as the rate of nova and supernova explosions in distant galaxies. (Auth. mod.)

K-54794

Hereld, M., **SPIREX - Near infrared astronomy from the South Pole,** Infrared astronomy with arrays: the next generation, edited by I.S. McLean, Dordrecht, Kluwer Academic Publishers, 1994, p.248-252.

DLC QB470.A1I535

Over the next several years, a series of spectrometers, imagers, and telescopes will be deployed at the South Pole as part of a project named SPIREX (South Pole Infrared Explorer). The goal is to survey a substantial area of the sky to study the origins of galaxies and stars. From space, the zodiacal light is the limiting source of noise over a wide range of wavelengths. It has a minimum in the NIR: the reflected sunlight is diminishing with wavelength and reradiated thermal emission from the warm dust is on the rise. For this and other reasons, the NIR is potentially the best window in which to carry out deep surveys of galaxies. On the ground, the sensitivity of observations in the NIR is limited by the Poisson noise of the large background flux from the atmosphere and telescope. Within a restricted wavelength range, this background depends only on two parameters: their temperature and emissivity. By building very low emissivity telescopes and operating them in the bitter cold of the antarctic winter, it will be possible to make observations that will rival in sensitivity those attainable from cooled space-based telescopes. (Auth.)

K-54860

Ikeda, M., Nagano, I., Shimbo, T., Carpenter, D.L., **Intensities and polarization rates of whistler mode VLF signals observed from a ground network near *L*=4,** *Journal of geophysical research,* Apr. 1, 1995, 100(A4), p.5691-5703, Refs. p.5702-5703.

VLF signals transmitted from Siple Station that propagated through the ionosphere and magnetosphere to the Northern Hemisphere and triggered emissions generated by the Siple signals in the magnetosphere are radiated from wave exit areas on the ionospheric lower boundary. The locations and extent of the wave exit areas are deduced from the wave intensity distributions measured on the ground. In this method the authors use measurements of wave magnetic intensity made simultaneously at six stations. As a result of analyzing a triggered emission in detail, the extent of the wave exit area of the downgoing triggered emission is estimated to be 25-50 km or so at an altitude of 80 km. It is believed that this value relates to the horizontal extent of the duct through which the triggered emission propagates in the magnetosphere and ionosphere and that essentially only direct waves transmitted from the wave source arrive within a range of 200 km from the wave intensity peak on the ground. (Auth. mod.)

K-54895

Miller, T., AMANDA Collaboration, **Initial analysis of coincident events between the SPASE and AMANDA detectors,** *Nuclear physics B. Proceedings supplements,* June 1995, Vol.43, Trends in atmospheric physics. Proceedings of the workshop, p.245-248, 7 refs.

DLC QC770.N772

The present South Pole Air Shower Experiment (SPASE-1) and Antarctic Muon and Neutrino Detector Array (AMANDA) have been running in coincidence at the Amundsen-Scott Base since Feb., 1994. With both detectors runninng together, air shower size and direction can be measured by SPASE-1 and muon content measured by AMANDA. By studying events that trigger both detectors one can gain information about the primary cosmic ray composition in the region around the knee. The ability to find and analyze the coincident events has been demonstrated and the results as of Sep., 1994 are described. In addition, coincident operation of SPASE-1 and AMANDA is proving to be an extremely valuable diagnostic tool for AMANDA in studies of the ice clarity and performance of the array.

K-54956

Klaĭn, B.I., Kurazhkovskaia, N.A., Dovbnia, B.V., **Relationship between the θ-aurora and ULF emissions at high latitudes** [Sviaz' θ-siianiĭ s nizkochastotnymi izlucheniiami v vysokikh shirotakh], *Antarktika,* 1993, No.32, p.5-10, In Russian with English summary. 12 refs.

Variations in the electromagnetic emission accompanying the appearance of θ-aurora in the magnetosphere over polar regions have been studied. The study is based on the data obtained by antarctic and arctic observatories. It has been shown that modulated LF emissions appear within the range of 1.01-1.5 Hz where the characteristic modulation period is equal to ~30 min. during the θ-aurora on the latitude of the dayside cusp. These emissions precede the development of the transpolar arc in the night area of the polar cap by 15-30 min. The revealed effect may be explained by the development of a reconnection process in the cusp region, when B_z>0, and the following reconfiguration of the magnetospheric tail. (Auth.)

K-54976

Neudegg, D.A., et al, **Sources and velocities of Pcl-2 ULF waves at high latitudes,** *Geophysical research letters,* Nov. 1, 1995, 22(21), p.2965-2968, 16 refs.

The polar cusp and boundary layer are important in eoupling magnetospheric energy sources to the high latitude ionosphere. Ultra high frequency (ULF) waves are one of the processes by which this coupling is realized. To study the source regions and propagation characteristics of discrete Pc1-2 (0.1-2 Hz) ULF wave packets, particularly of unstructured emissions and Pc1 bursts at high latitudes, a triangular array of closely spaced induction magnetometers (ca 150 km) was deployed beneath the average cusp projection during the 1992 antarctic winter. Wave sources were poleward of the array at low geomagnetic activity and equatorward at high activity. These results are interpreted as indicative of the ionospheric signature of sources localized in the cusp, the low latitude boundary layer or the outer magnetosphere. Intercalibration of the results for typical events with extrapolations of radar observations and satellite particle signatures support sources within these regions. The results suggest a technique for monitoring the high latitude boundary regions and outer magnetosphere using local ULF wave measurements. (Auth. mod.)

K-54980

Arriagada M., M.A., Foppiano B., A.J., **Maximum ionospheric electronic concentrations over King George I. and Concepción, Chile** [Altura del máximo de concentración electrónica en la ionosfera sobre isla Rey Jorge, Antártica, y Concepción, Chile continental], *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.49-56, In Spanish with English summary. 10 refs.

Maximum ionospheric electronic concentration heights over Concepción, Chile and King George I. were determined for each hour of June, Sep. and Dec. of 1986 and 1989, years which could be considered representative of low and high solar activity level conditions. The determinations were made using a well-known empirical formula with hourly values of ionospheric characteristics foF2, M(3000) F2 and foE derived from corresponding ionograms for the indicated periods. Heights are found to increase from winter to summer during most hours, for both locations and at low and high solar activity levels. Heights increase when the solar activity level is higher. Time-of-day variations can be adequately modeled for most cases using only diurnal, semidiurnal and terdiurnal harmonic components. (Auth.)

K-54981

Cordaro, E.G., Storini, M., **LARC/6-NM-64: atmospheric pressure effects,** *Santiago de Chile. Instituto Antártico Chileno. Serie científica,* 1995, No.45, p.57-66, With Spanish summary. Refs. p.64-66.

An antarctic laboratory for cosmic rays (LARC) has been operating on King George I. since Jan. 19, 1991. The cosmic ray detector is a standard 6-NM-64. Results based on the 1991-93 dataset are reported to facilitate the elimination of pressure-induced effects on the recorded cosmic-ray intensities. The authors found a barometric coefficient of about 0.74%/mb as the most appropriate value to be used. (Auth.)

K-55019

Shea, M.A., Smart, D.F., Dreschhoff, G.A.M., Zeller, E.J., **Flux and fluence of major solar proton events and their record in antarctic snow,** *Phillips Lab/GPSG. Technical report,* Mar. 1994, PL-TR-94-2061, 5p., ADA-277 485, Reprint from 23rd International Cosmic Ray Conference, Conference Papers, 3, 846-849, 1993.

A study of the major solar proton events since 1955 has shown that the large fluence events are likely to be associated with a solar flare source near the central meridian of the sun, while events with large peak proton-flux are likely to be associated with solar flares near the west limb of the sun. The authors compare the solar proton events to the measurements of nitrate concentrations in the antarctic ice and find that the largest concentrations are associated with the major fluence events. From these results, they are able to assign a probable solar proton event source to three of the major peaks in the nitrate record prior to 1955. (Auth.)

K-55021

Burton, M., **Site testing Antarctica for astronomy,** Astronomical Society of the Pacific, Airborne Astronomy Symposium on the Galactic Ecosystem: from gas to stars to dust, Vol.73, edited by M.R. Haas, J.A. Davidson and E.F Erickson, San Francisco, 1995, p.559-562, 8 refs.

DLC QB470.A1A37

The Antarctic Plateau provides the pre-eminent sites on the surface of the Earth for many types of astronomical observation. Australia has embarked on a site testing program to quantify the ultimate sensitivity levels achievable. The program is now in operation at the South Pole, where an infrared sky brightness monitor and micro-thermal temperature sensors have been deployed. The plan is to extend these measurements, first at the Pole, and then to the highest parts of the Plateau, Domes Argus and Circe. The latter will involve adapting an Automated Geophysical Observatory, a mobile laboratory designed for autonomous operation on the Plateau, for astrophysical purposes. (Auth.)

K-55022

Novak, G., Platt, S.R., Dragovan, M., **Polarimetric submillimeter observations from the South Pole,** Astronomical Society of the Pacific, Airborne Astronomy Symposium on the Galactic Ecosystem: from gas to stars to dust, Vol.73, edited by M.R. Haas, J.A. Davidson and E.F Erickson, San Francisco, 1995, p.563-566, 15 refs.

DLC QB470.A1A37

The authors discuss proposed observations of the polarization of submillimeter continuum emission from the extended Galactic Center region. The observations will be made from the South Pole, using the VIPER 2 m telescope. (Auth.)

K-55023

Pernic, R.J., Harper, D.A., Jr., Bausch, J.A., **Center for Astrophysical Research in Antarctica,** Astronomical Society of the Pacific, Airborne Astronomy Symposium on the Galactic Ecosystem: from gas to stars to dust, Vol.73, edited by M.R. Haas, J.A. Davidson and E.F Erickson, San Francisco, 1995, p.669-672.

DLC QB470.A1A37

The National Science Foundation Center for Astrophysical Research in Antarctica (CARA) is described. At its inception, the Center organized its research into four projects. Three—AST/RO, COBRA, and SPIREX—address key problems in star formation, evolution of galaxies, and the distribution of matter in the early universe. They feature surveys which can be conducted effectively with moderate-size telescopes operated in a highly automated mode. They also explore the potential of the Antarctic Plateau for a broad range of astrophysical research over a spectral range extending from the near-infrared to millimeter wavelengths. A fourth ATP was created to obtain quantitative data on the qualities of the South Pole site and to plan for future scientific projects. During the next five years, AST/RO, COBRA, and SPIREX will become operational, and the Center will begin to build a second generation of telescopes which can address a broader range of problems and accommodate a larger community of users.

K-55025

Barwick, S.W., et al, **AMANDA: Antarctic Muon And Neutrino Detector Array,** Trends in astroparticle-physics, edited by P.C. Bosetti. Proceedings of the 2nd International Conference on Trends in Astroparticle-Physics, Aachen, Germany, Oct. 10-12, 1991, Stuttgart, B.G. Teubner Verlagsgesellschaft, 1994, p.211-216, 7 refs.

DLC QB463.T75 1994

Enormous detectors with unprecedented sensitivity will be required to search for astrophysical sources of neutrinos. If the transparency of deep polar ice is similar to that measured in the laboratory, then AMANDA (Antarctic Muon and Neutrino Detector Array) may be the most cost-effective way to reach the detector volumes required to search for astrophysical sources of high energy neutrinos or WIMP annihilation within the sun. The authors describe a series of tests to be conducted near Amundsen-Scott Station during the '91-'92 antarctic campaign. The primary goal of these tests is to extend the optical transparency measurements of polar ice to a depth of one km by measuring the rate of downward-moving muons with a prototype string of 4 optical modules. Additional objectives include the measurement of up/down discrimination, background light levels, and timing resolution. The design of the prototype string and its expected performance based on laboratory calibrations are discussed. (Auth.)

K-55038

Stoker, P.H., **Riometer absorption events at SANAE, L=4.0,** *Astrophysics and space science,* Aug. 1995, 230(1-2), p.405-413, 17 refs.

The absorption of cosmic radio noise passing through the ionosphere may be described as a function of radio wave frequency $A(f_e) \alpha f_e^{-n}$, with $n \approx 2.0$ for spatially uniform precipitation of electrons and $n<2.0$ for spatially nonuniform precipitation. Using multifrequency riometer recordings at SANAE, the following observations are reviewed: the frequency distribution of the power index, n, obtained from 4 min averaged absorptions during 1983, shows a most probable value around $n \approx 1.5$, indicating that mostly energetic electrons are precipitated spatially structured onto the upper atmosphere, as in an optical aurora. Multifrequency riometer recordings suggest that field-aligned ionospheric irregularities have scattered additional cosmic radio waves from the central region of the Galaxy into the fields of view of the riometer antennae during an auroral absorption event in the early morning hours of July 27, 1982. Gradual increases in absorptions observed at all three riometer frequencies from onset at 11:50 UT of the largest solar proton ground level enhancement on Sep. 29, 1989, until 18:00 UT, suggest diffusion of the much more intense low energy protons from the polar cap to the L=4.0 geomagnetic field shell and subsequent precipitation at SANAE due to the South Atlantic Geomagnetic Anomaly. The flux of electron energy deposited per second at SANAE is closely related to geomagnetic activity. (Auth. mod.)

K-55039

Walker, A.D.M., **Radar studies of magnetosphere dynamics,** *Astrophysics and space science,* Aug. 1995, 230(1-2), p.415-430, Refs. p.429-430.

Ionospheric radars are an important tool for studying magnetospheric dynamics. The nature of such instruments is described and their application to a number of important problems is discussed, emphasizing South African work. A study of the theory of reflection from irregularities is discussed. The nature of ULF pulsations of more than one type has been elucidated by radar studies. An improvement of the understanding of magnetospheric convection has been achieved. A new HF radar experiment being developed for operation at SANAE Station is described. An HF radar will be operated at SANAE in conjunction with the British radar at Halley to provide vector information about magnetospheric convection within that part of the magnetosphere which maps to a large portion of the antarctic continent. The radar will be part of the SuperDARN international network of radars. (Auth.)

K-55040

Hughes, A.R.W., **VLF waves in the magnetosphere,** *Astrophysics and space science,* Aug. 1995, 230(1-2), p.431-438, 14 refs.

The study of VLF waves at ground-based stations is an important source of information on particles trapped in the magnetosphere. By various techniques it is also possible to measure plasma densities, electric fields and monitor energetic particle injection. By observing the propagation of waves beneath the ionosphere it is possible to study particle precipitation from the magnetosphere. In this paper the author summarizes some of the techniques and results obtained from the study of VLF waves at SANAE Station. (Auth.)

K-55041

Scourfield, M.W.J., **Auroral research,** *Astrophysics and space science,* Aug. 1995, 230(1-2), p.457-469, 11 refs.

An auroral substorm, unique in that it occurred at the relatively low latitude of SANAE, is described based on the full range of observational techniques at SANAE together with satellite data. Some features fit the generally accepted picture of substorms, others do not. From ground-based television imagery of Giant Undulations the temporal evolution of their dynamics is obtained and possible theories for their existence examined. Super fast auroral waves, with speeds of up to 1200 km/s, have been observed for the first time. Their characteristics cannot as yet be accounted for by a single generation mechanism. The potential value of simultaneous recordings of aurorae by television and riometer is discussed. (Auth.)

K-55076

Kiernan, V., **South Pole neutrino trap languishes in the snow,** *New scientist,* Jan. 20, 1996, 149(2013), p.10.

Astrophysicists are continuing the installation of the world's largest cosmic ray, AMANDA (Antarctic Muon and Neutrino Detector Array) at Amundsen-Scott Station. The photodetectors will be suspended in boreholes drilled by hydraulic jets beneath the antarctic sheet. Detection occurs when photoelectric sensors react to optical displays termed Cherenkov radiation, which is manifested when neutrinos interact with water molecules in the ultrapure ice to generate a shower of muons.

K-55123

Arnoldy, R.L., Engebretson, M.J., **Magnetic impulse events measured at Pc 1 frequencies and at multiple sites,** *Antarctic journal of the United States,* 1994, 29(5), p.317-318, 2 refs.

Magnetic impulse events (MIEs) are impulsive fluctuations in the Earth's ambient magnetic field. These fluctuations have periods that range from a few seconds to several hundred seconds and durations that are on the order of the period. A figure gives an example of an MIE seen at Sondre Stromfjord, Greenland, which is a high-latitude site at the same geomagnetic latitude as South Pole but 2 hours ahead of South Pole in local time. The high frequency (about 0.5 Hz) Pc 1 waves associated with the MIE are evident. In an analysis of several hundred MIE, these Pc 1 waves are present about 70% of the time. The authors have identified and analyzed some 300 Sondre Stromfjord and South Pole MIE events.

K-55124

Inan, U.S., Reising, S.C., **Global thunderstorm tracking via measurements of radio atmospherics at Palmer Station,** *Antarctic journal of the United States,* 1994, 29(5), p.319-320, 8 refs.

The VLF measurements at Palmer Station are conducted using highly sensitive VLF antennas and receivers. The relatively quiet (electromagnetically speaking) nature of the site, its geomagnetic conjugacy to major thunderstorm centers in the east coast of the United States, and its proximity to the South Atlantic magnetic anomaly make Palmer Station a unique site for these studies. During the past 2 years, an additional potential use of the Palmer VLF data has emerged. It now appears that thunderstorm activity on a global scale can be tracked with the help of VLF measurements at Palmer Station. In this article, the authors illustrate two examples of the use of the VLF Fourier goniometry technique with Palmer data.

K-55125

Engebretson, M.J., Alford, J.L., Goerke, R.T., **Study of seasonal variations in the occurrence and characteristics of quasiperiodic very-low-frequency emissions,** *Antarctic journal of the United States,* 1994, 29(5), p.321-322, 4 refs.

At high latitudes, radio emissions with frequencies ranging from approximately 500 to 2,000 Hz are often found to be modulated quasiperidically at much lower frequencies near 0.03 Hz in the ultra-low-frequency (ULF) range. Using 1988 data from Amundsen-Scott Station, the authors have found seasonal variations in the radio frequency of these "quasiperiodic" or QP emissions that provide information about processes in a high-latitude region of the Earth's outer magnetosphere that has seldom been explored by spacecraft. Although most magnetospheric wave-generation processes had been assumed to take place at the equator, this study indicates the importance of off-equatorial wave sources in the outer dayside magnetosphere.

K-55128

Berkey, F.T., Kelly, C.N., **Transient auroral events observed from South Pole Station,** *Antarctic journal of the United States,* 1994, 29(5), p.325-327, 6 refs.

The transfer of energy from the solar wind to the Earth's magnetosphere is a problem of fundamental interest to magnetospheric physicists. Scientists believe that an ionospheric signature of these processes must exist and various candidate events have been suggested. From the analysis of all-sky camera (ASC) film acquired at Amundsen-Scott Station, the authors have identified a series of transient enhancements in the brightness of an unusually stable dayside arc system that was present for several hours in the late afternoon sector on Aug. 16, 1985.

K-55129

Clark, K.C., Hernandez, G., Smith, R.W., **Wide-aperture light source,** *Antarctic journal of the United States,* 1994, 29(5), p.327-329, 2 refs.

Quantitative investigations of emission line profiles by use of a Fabry-Perot spectrometer require periodic calibration of the optical finesse of the instrument. In a laboratory setting, this calibration procedure is relatively straightforward: it consists of measuring the reflection coefficients of the Fabry-Perot flats in a suitably equipped laboratory. To calibrate operating field instruments, however, such as the Fabry-Perot spectrometer running at Amundsen-Scott Station, specialized procedures must be employed to avoid disturbing the critical alignment of the spectrometer elements. The authors use the Giacomo method of measuring Fabry-Perot etalon reflection coefficients, coupled with single wavelength laser measurements, to determine the overall instrumental finesse. To conduct these etalon reflectivity measurements with no disturbance of alignment, they have developed a new thin, large-aperture, broadband continuum-light source.

K-55130

Kogut, A., Bersanelli, M., Maino, D., De Amici, G., Smoot, G.F., **Polar measurements of atmospheric continuum microwave emission,** *Antarctic journal of the United States,* 1994, 29(5), p.329-331, 8 refs.

The cosmic microwave background (CMB), a relic from the early Universe, allows us to probe the physical conditions and processes from that era. As part of a campaign to measure the long-wavelength spectrum of the CMB, U.S.-Italian collaboration has measured atmospheric emission from a site near the Amundsen-Scott Station in the austral summers of 1989 and 1991.

K-55131

Jefferies, S.M., Duvall, T.L., Jr., Harvey, J.W., **Helioseismology from South Pole: a clear view of the Sun,** *Antarctic journal of the United States,* 1994, 29(5), p.331-332, 3 refs.

Helioseismology is the study of the composition and physics of the Sun's interior and atmosphere via observations of its acoustic oscillations. These oscillations are manifest as intensity and velocity perturbations of the solar surface. One way to observe them, therefore, is to record the temporal and spatial variations of the solar intensity distribution. This can be done by imaging the full solar disk onto a two-dimensional detector such as a charge-coupled device. Unfortunately, any recorded image is inevitably a blurred measure of the intensity distribution that one is trying to measure. The authors have developed a technique for measuring the blurring function directly from each recorded image together with a deconvolution procedure to use this information to restore the image photometrically. The improvement in image quality produced by the restoration is dramatic and is demonstrated in solar disc images taken at South Pole.

K-55132

Bieber, J.W., Evenson, P., Lin, Z.M., **Solar cosmic-ray observatories at polar sites,** *Antarctic journal of the United States,* 1994, 29(5), p.333-335, 3 refs.

Detailed information on the acceleration and transport of solar cosmic rays can be derived through analysis of their angular distribution. The authors show in this article that polar observing sites offer unique advantages for making the requisite measurements with ground-based detectors. The advantages of polar sites for studying cosmic-ray angular distributions are readily apparent in a figure and a table.

K-55133

AMANDA Collaboration, **First data and future prospects for AMANDA, the antarctic muon and neutrino detector,** *Antarctic journal of the United States,* 1994, 29(5), p.337-339, 3 refs.

The AMANDA high-energy neutrino observatory will address fundamental questions in astronomy and particle physics. AMANDA can search for the sources of the highest energy cosmic rays and for dark matter; it can address the question of whether neutrinos have mass; and it can look for entirely unanticipated phenomena. In contrast to high-energy photons, which are absorbed by matter, high-energy neutrinos can help scientists do a tomographic study of such objects as active galactic nuclei and even the Earth's core.

K-55134

Evenson, P., et al, **South Pole air shower experiment,** *Antarctic journal of the United States,* 1994, 29(5), p.339-341, 4 refs.

Since Feb. 1994 the South Pole air shower experiment (SPASE) has been running in coincidence with 4 strings of the antarctic muon and neutrino detector array (AMANDA) experiment that were deployed during the 1993-94 austral summer. The air shower array consists of 16 scintillatory detectors, each of 1 m^2 area, on a triangular grid with 30 m spacing. In addition, there are 8 guard ring detectors on an approximately 80 m radius, which are similar in size and construction, except that they lack the fast-timing capability of the central detectors. When the surface array is triggered by a cosmic-ray cascade in the atmosphere, a signal is transmitted in the AMANDA central station to read out its data.

K-55135

Gundersen, J., Lim, M., Gaier, T., **Preliminary analysis of the University of California's degree-scale anisotropy measurements of the cosmic microwave background,** *Antarctic journal of the United States,* 1994, 29(5), p.341-343, 6 refs.

Anisotropy measurements of the cosmic microwave background (CMB) provide an effective method for testing cosmic structure formation models. In particular, degree-scale anisotropy measurements can be powerful in constraining scenarios of large-scale structure formation and values of global parameters in cosmic evolution models. The authors report here on their most recent measurements, which were made during the austral summer 1993-94 at Amundsen-Scott Station.

K-55136

Stark, A.A., et al, **Predeployment tests of the Antarctic Submillimeter Telescope and Remote Observatory instrument,** *Antarctic journal of the United States,* 1994, 29(5), p.344-345, 4 refs.

The Antarctic Submillimeter Telescope and Remote Observatory (AST/RO) instrument is a 1.7 m diameter telescope scheduled for installation at Amundsen-Scott Station in late 1994. AST/RO is a general-purpose instrument for millimeter, submillimeter, and far-infrared wavelengths. The scientific goals include heterodyne spectroscopy of galactic molecular clouds and molecular lines in the Earth's stratosphere at wavelengths near 600 microns. This article describes observations made from the AST/RO test site at Boston University in 1993 and 1994.

K-55137

Rosenberg, T.J., Doolittle, J.H., **Studying the polar ionosphere and magnetosphere with automatic geophysical observatories: the U.S. program in Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.347-349, 10 refs.

This AGO science program is called the polar experiment network for geophysical upper-atmosphere investigations (PENGUIN) and is the product of a team of U.S. and Japanese investigators with long experience in successfully conducting ionospheric and magnetospheric research in Antarctica. The network, when completed, will consist of a suite of instruments (optical and radiowave auroral imagers, magnetometers, and narrow- and wide-band radio receivers) placed at six AGO locations on the polar plateau. The instruments, their designated AGO sites, the responsible principal investigators, and institutions are given in a table.

K-55138

Doolittle, J.H., Mende, S.B., **Coordinated auroral observations at South Pole Station and AGO-P2,** *Antarctic journal of the United States,* 1994, 29(5), p.349-352, 5 refs.

The Amundsen-Scott Station is located at a magnetic latitude of about 74.2°, which places it inside the polar cap during magnetic nighttime where field lines map to the magnetospheric tail. During magnetic midday, the Station is situated under the magnetospheric cusp where the field lines are believed to open to the interplanetary magnetic field. Since the austral winter of 1989, the authors have been using a novel dual-channel all-sky camera that permits simultaneous observations of both 630.0 nm O($^1D_2$) and 427.8 nm N_2^+ auroral emissions to separate the hard and soft precipitation. The system records the local space, time, and energy morphology of auroral precipitation. They have investigated the optical signature of impulsive magnetic events that were interpreted as the ground-based signature of "flux transfer events". These observations have shown that these impulsive events take place on the inner side of the polar cusp, and therefore, if they are to be interpreted as the flux transfer events, then they must be the signature of the initial phase of the event and not the convective phase as it had been interpreted earlier.

K-55139

Rosenberg, T.J., Detrick, D.L., **Coordinated auroral absorption observations at South Pole Station and AGO-P2,** *Antarctic journal of the United States,* 1994, 29(5), p.352-354, 8 refs.

The combination of automatic geophysical observatories (AGOs) and manned stations in Antarctica is intended to facilitate studies of the polar upper atmosphere. In particular, simultaneous observations with essentially similar instrumentation at all sites will enable the separation of spatial and temporal effects and will provide the means to follow the evolution, progression, and decay of geophysical phenomena over great distances. The first opportunity to carry out such investigations involves the use of data from AGO-P2 and Amundsen-Scott Station. The analysis presented here of a Sun-aligned arc observed at two locations using different imaging techniques offers a glimpse of how the data from multiple spaced instruments in the AGO/manned station framework will help to clarify the interpretation of polar upper atmosphere phenomena.

K-55140

Detrick, D.L., Lutz, L.F., **16-beam phased-array radiowave imager for studies of cosmic noise absorption at U.S. AGO sites,** *Antarctic journal of the United States,* 1994, 29(5), p.354-356, 4 refs.

A significant improvement in the riometer technique for examining cosmic noise absorption was made with the installation of a 49-beam phased array riometer system at Amundsen-Scott Station in Jan. 1988. The use of antenna arrays producing multiple narrow beams is necessary to examine the spatial scale of regions of energetic electron precipitation that are coincident with cosmic radio noise absorption activity and to resolve time development from spatial motion. The power requirements for the antenna/phasing system are minimal. The designed total electrical power budget for the system is shown in a table. In operation, the system typically consumes about 4.8 watts, with occasional increases to 6.7 watts when the internal heaters activate to bring the interior temperature to the designed operating level of -10°C.

K-55141

Detrick, D.L., Rosenberg, T.J., **Initial results from the PENGUIN imaging riometer at AGO-P2,** *Antarctic journal of the United States,* 1994, 29(5), p.356-358, 5 refs.

PENGUIN (the polar experiment network for geophysical upper-atmosphere investigations) represents the science programs associated with the automatic geophysical observatories (AGOs) deployed on the antarctic plateau. The first AGO was installed in Dec. 1992. The site, which has been designed P2, was the first of six planned AGO installations to be deployed. The PENGUIN program studies the upper atmosphere using a variety of instruments that provide information for the analysis and interpretation of phenomena that affect the Earth's near-space environment.

K-55142

Inan, U.S., Brown, A.D., Yarbrough, J., **Initial results from the PENGUIN ELF/VLF receiver at AGO-P2,** *Antarctic journal of the United States,* 1994, 29(5), p.359-361, 5 refs.

The subject of electrodynamic coupling of upper atmospheric regions and quantitative understanding of the energy transport between the magnetosphere and the ionosphere constitute important objectives of the polar experiment network for geophysical upper-atmosphere investigations (PENGUIN) program. Measurements of ELF/VLF waves at multiple stations provide a powerful means of remotely sensing magnetospheric processes. The event that the authors illustrate in this article was recognized by viewing summary plots of narrowband ELF/VLF channels (also referred to as hiss filters) of data recorded at P2 for the 9-day period of May 23-31, 1993, for which AGO-P2 data were made available to the PENGUIN investigators. On May 25, 1993, very intense and relatively short duration wave activity was observed in all channels, during an otherwise extremely quiet period. Insight into the wave phenomena is provided in a figure, where synoptic wideband data recorded at South Pole is shown. Also shown for comparison are the 2-4 kHz channel outputs recorded at P2 and South Pole: one sees that the wave activity reaches its peak approximately 5 minutes later at South Pole than at P2 and that the absolute intensities of the waves are nearly twice as large at P2 as at South Pole.

K-55143

Shafer, D.C., Brown, A.D., Trabucco, W.J., Inan, U.S., **Programmable and low-power ELF/VLF receiver for automatic geophysical observatories,** *Antarctic journal of the United States,* 1994, 29(5), p.361-363, 1 ref.

Measurements of electromagnetic waves in the extremely-low-frequency and very-low-frequency (ELF/VLF) ranges (300 Hz to 30 kHz) have been carried out from various antarctic stations for the past 30 years. As part of the Stanford University participation in the PENGUIN program, a fully digital and programmable low-power ELF/VLF receiver system has been designed and built. In this article, the authors describe the basic properties of this new system and show sample data acquired at P2, Antarctica.

K-55144

Weatherwax, A.T., LaBelle, J., Trimpi, M.L., **Auroral radio emissions observed at AGO-P2,** *Antarctic journal of the United States,* 1994, 29(5), p.363-364, 3 refs.

The AGOs on the antarctic polar plateau provide an excellent platform from which to study high-latitude ionospheric processes. In particular, the AGOs provide an exceptionally quiet electromagnetic environment for the operation of radio receivers in the low-frequency/medium-frequency/high-frequency (LF/MF/HF) bands. During the 1992-93 austral summer, this type of radio receiver was incorporated into the first of six proposed AGOs (AGO-P2). A list of the experiments aboard AGO-P2 is given in a table. Preliminary data taken from only 1 week of operation at AGO-P2 are discussed.

K-55145

Weatherwax, A.T., LaBelle, J., Trimpi, M.L., **Comparison of electromagnetic noise at ground-based radio observing sites,** *Antarctic journal of the United States,* 1994, 29(5), p.365-366, 3 refs.

Although sporadic reports of ground-based LF-HF radio emissions from aurora have appeared during the past 4 decades, only in the last few years has a concerted effort been made to monitor radio emissions systematically in the frequency range between 100 kHz and 5 MHz on the ground. Dartmouth College has operated six radio receiving systems in the high-latitude regions at specific locations, two sites in Alaska and four sites in Antarctica. Essentially identical instrumentation is employed at all six sites. A figure shows five spectra from each of the observing sites listed in the table. Overall, the three electromagnetically quietest sites are AGO-P1, -P2, and -P4; AGO-P1 is the noisiest of the three AGO sites. In contrast, the noisiest site overall is at Amundsen-Scott Station. South Pole data were obtained during the busy summer season, however, when electromagnetic interference would be at its highest. Nonetheless, it does represent the noisiest of the four antarctic locations studied during the 1993-94 austral summer.

K-55146

Wolfe, A., Lanzerotti, L.J., Maclennan, C.G., Arnoldy, R.L., **Simultaneous enhancement of Pc1, Pc4, Pc5 hydromagnetic waves at AGO-P2, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.366-368, 12 refs.

Simultaneous observations of several narrow-band magnetic fluctuations in the hydromagnetic wave band are reported from the new AGO site P2 near the auroral zone in the Antarctic. These magnetic pulsations are found in the Pc1 (approximately 1 Hz), Pc4 (approximately 100-second period) and Pc5 (approximately 300-second period) bands. These observations, recorded on the ground during very quiet geomagnetic conditions, may be the first reported pulsations extending across a broad band of the Pc frequency regime.

K-55147

Fukunishi, H., Taguchi, M., Lanzerotti, L.J., **Pc1-2 pulsations observed by a search-coil magnetometer at AGO-P2,** *Antarctic journal of the United States,* 1994, 29(5), p.369-371, 10 refs.

The first automatic geophysical observatory (AGO) for the polar experiment network for geophysical upper-atmosphere investigations (PENGUIN) was deployed at site P2 in Dec. 1992. The PENGUIN data at P2 were continuously recorded on an optical disk until the end of May 1993 when the data-acquisition system suffered a failure. The recorded data were recovered in Dec. 1993. The purpose of the AGO search-coil magnetometer experiment is to study the generation and propagation mechanisms of high-latitude magnetic variations in the frequency range of 0.001-1.0 Hz. This article presents a preliminary analysis of the search-coil data, focusing on the frequency range of 0.1-1.0 Hz.

K-55156

Vovk, V.IA., **Reverse signal parameters from the data of oblique sounding in the Antarctic,** *Geomagnetism and aeronomy,* Feb. 1995, 34(4), p.553-555, Translated from Geomagnetizm i aeronomiia, July-Aug. 1994. 9 refs.

The highest observed frequencies (HOF) and lowest observed frequencies (LOF) as well as variations of amplitude and Doppler parameters of signals from oblique ionospheric sounding depend on the orientation of the radiocircuit relative to large-scale ionosphere structures. Changes in the LOF and Doppler spectra of reverse signals are due to the intersection of ionospheric radiocircuits with irregularities in the polar cap region. An excess of more than 100% in experimental values of the HOF for the reverse signals over the calculated values at 0600-1700 UT can be explained by ionospheric anomalies or by different propagation mechanisms, in particular by the deflection of the path from the great circle arc. (Auth.)

K-55172

Burton, M.G., **Why Antarctica?,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.2-6, 15 refs.

The dry, cold, tenuous and stable air above the Antarctic Plateau provides superb conditions for the conduct of many classes of astronomical observations. The author reviews in particular the rationale for undertaking near-IR, mm and particle astronomy in Antarctica, disciplines in which telescopes are now operating at the U.S. Amundsen-Scott Station. (Auth.)

K-55173

Bailey, J., **Infrared surveys from Antarctica,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.7-9, 9 refs.

The very low background observed from Antarctica in a window from about 2.25 to 2.45 μm can be exploited as a way of making deep near-IR surveys over wide areas of sky. Imaging surveys using the entire window can cover large areas of sky to limits of around K=20, and can be used to study galaxy evolution and to search for high-redshift quasars, dust-obscured quasars and brown dwarfs. It is also possible to make spectroscopic surveys in this window. The window includes molecular hydrogen emission and CO absorption in galactic sources, and can also be used to search for emission lines such as Hα in high-redshift star-forming galaxies. (Auth.)

K-55174
Viotti, R., Vignato, A., Nanni, D., Maceroni, C., Badiali, M., **Astrophysical value of continuous photometric monitoring from the Antarctic Plateau,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.10-13, 9 refs.

Among the astrophysical researches which will largely benefit from observation from the Antarctic Plateau, the authors consider those which require high-quality, continuous, daylight, uninterrupted observation in the optical-near-IR region. The systematic study of the stellar micro-oscillations and surface activity of individual objects, as well as of stellar associations extended for periods of weeks, will make a fundamental contribution to the knowledge of stellar structure and will ultimately provide the physical parameters of the stars. A similar consideration applies for the short-period (a few hours to a few days) binaries, which include the W UMa contact binaries. These objects are subject to continuously varying light curves associated with surface activity and secular effects, which cannot be adequately studied from the currently available ground telescopes. (Auth. mod.)

K-55175
Balm, S.P., **Antarctic Submillimeter Telescope and Remote Observatory (AST/RO),** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.14-16, 9 refs.

The Antarctic Submillimeter Telescope and Remote Observatory (AST/RO) is a highly automated 1.7 m diameter telescope aimed at exploiting the superb submillimeter skies of the Antarctic Plateau for astronomy and aeronomy studies. It was recently installed at the Amundsen-Scott Station during the 1994-95 austral season and is currently undergoing its first winter-over of operation. In this paper, the author briefly outlines the capabilities of the instrument and describes some recent achievements culminating in the telescope's first observations of the South Polar submillimeter sky. (Auth.)

K-55176
Ashley, M.C.B., Brooks, P.W., Lloyd, J.P., **Remote control of astronomical instruments via the Internet,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.17-21, 8 refs.

A software package called ERIC is described that provides a framework for allowing scientific instruments to be remotely controlled via the Internet. The package has been used to control four diverse astronomical instruments, including the Infrared Photometer Spectrometer (IRPS), a near-infrared single-detector system that has been operating at the Amundsen-Scott Station since Jan. 1994. The Internet reaches the South Pole via geostationary satellites that have drifted away from a low-declination orbit (and hence are visible from the Pole). (Auth. mod.)

K-55177
Bally, J., et al, **Hartmann Differential Image Motion Monitor (H-DIMM) for atmospheric turbulence characterisation,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.22-27, 7 refs.

The authors describe the use of a multi-aperture Hartmann mask coupled to a slightly out-of-focus focal plane array imager to monitor atmospheric turbulence ('seeing') produced by refractive index fluctuations. The H-DIMM method was first used at the South Pole in Jan. 1995, with a 6 in. *f*/10 refractor (the Volna telescope) using a three-aperture mask. During 1995, they are using an H-DIMM mounted on the SPIREX telescope that is now located on top of a tower next to the CARA building at the South Pole, well isolated from local heat sources. They will be obtaining H-DIMM measurements using a video camera with the 24 in. SPIREX telescope and through a Celestron 11 in. telescope that is mounted on the side with an ST-6 camera. (Auth. mod.)

K-55178
Valenziano, L., **Infrared site testing in Antarctica,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.28-29, 6 refs.

Site testing campaigns in the mid-IR wavelength range have been carried out in Antarctica in the last two southern summer seasons. A description of the experimental apparatus at Dome C and some preliminary results are presented in this work. Future plans are also discussed. (Auth.)

K-55179
Recabarren, P., Mosconi, M., García Lambas, D., Dellizzotti, J., Ozu, S., Hutka, J., **Installation of the J.L. Sersic astronomical observatory at 78° South,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.30-32, 4 refs.

In Dec. 1994, a Celestron CG11 Telescope was installed at Belgrano II Station for site seeing measurements and variable star observations. The authors describe the project, logistics, installation and working environment, and present the first quantitative observations of astronomical seeing conditions at the station. (Auth. mod.)

K-55180
Burton, M.G., et al, **JACARA's plans,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.33-34.

The plans of JACARA, the Joint Australian Centre for Astrophysical Research in Antarctica, for Australian involvement in future astronomical activities on the antarctic plateau are outlined. (Auth.)

K-55181
Storey, J.W.V., Ashley, M.C.B., Burton, M.G., **Automated astrophysical observatory for Antarctica,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.35-38, 5 refs.

Conditions on the high Antarctic Plateau would appear to be extremely favorable for a wide range of astronomical research. Before a decision can be made on constructing an observatory, data are required on site conditions at the most promising locations. To enable these data to be collected, a Lockheed Automated Geophysical Observatory is being purchased. This facility will be fitted with a suite of astronomical site-testing instruments and deployed to several sites on the Antarctic Plateau. This program will allow a definitive assessment of the site conditions to be made by the end of this century. (Auth.)

K-55182
Dopita, M.A., Wood, P.R., Hovey, G.R., **Automated DIMM telescope for Antarctica,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.39-43, 10 refs.

A knowledge of the on-ice seeing is a key requirement for planning future antarctic observatories. In this paper, the authors discuss the likely negative impact on seeing produced by the development of the deep winter surface temperature inversion (Ekman layer). The Automated Astronomical Site Testing Observatory (AASTO) will deploy, as one of its complement of site-testing instruments, an automated differential image motion monitor (DIMM) telescope designed to generate seeing data throughout the antarctic winter. Here they describe the multi-aperture concept which has been developed for this mission, and touch upon some of the critical technological considerations associated with the low power budget and with the requirement of autonomous operation at very low temperature (-90°C). (Auth.)

K-55183
Dall'Oglio, G., Miriametro, A., Morgante, G., Pizzo, L., Valenziano, L., **Instrument devoted to the study of mm/sub-mm galactic emission at Dome C,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.44-47, 3 refs.

An experiment has been developed in order to map the submillimeter Galactic emission at four different wavelengths between 400 μm and 2 mm at an angular scale of 1°. A binocular telescope system has been realized by means of two off-axis wobbling parabolic mirrors, each one coupled to a two-channel ^{3}He photometer. A first run of observations from Dome C is planned for the antarctic summer 1995-96. (Auth.)

K-55184
Dopita, M.A., Ford, H.C., Bally, J., Bely, P., **POST: a polar stratospheric telescope for the Antarctic,** *Astronomical Society of Australia. Publications,* Jan. 1996, 13(1), p.48-59, 8 refs.

The tropopause, typically at 16 to 18 km altitude at the lower latitudes, dips down to only 8 km in the polar regions, allowing access to the cold, dry and nonturbulent lower stratosphere by tethered aerostats. These can float as high as 12 km, have long operating lifetimes, and are extremely reliable. In contrast to free-flying balloons, they can stay on station for weeks at a time, and payloads can be safely recovered for maintenance and adjustment and relaunched in a matter of hours. The authors propose to use such a platform, located in the Antarctic, to operate a new-technology 4 m telescope with diffraction-limited performance in the near infrared. Thanks to the low ambient temperature ($\approx$200 K), thermal emission from the optics is of the same order as that of the zodiacal light in the 2-3 µm band. (Auth. mod.)

K-55200

Tonegawa, Y., Rokuyama, K., Makita, Y., Huigen, Y., Kadokura, A., Sato, N., **Upper atmosphere physics data obtained at Syowa Station in 1993,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.208, 201p., 14 refs.

This report summarizes upper atmosphere physics data acquired by the Upper Atmosphere Physics Monitoring (UAPM) System at Showa Station in 1993. The items of observation are as follows: geomagnetism; ELF-VLF waves; ionosphere (cosmic noise absorption at 30 MHz); and aurora. An outline of the system, specifications of the observation instruments, the recording periods, and the format of the compiled digital data are included. Summary plots for Jan.1-Dec. 31, 1993 are appended.

K-55201

Obara, N., Wakino, Y., Kubota, M., Iwasaki, K., Nishimura, H., Kadokura, A., **Upper atmosphere physics data obtained at Syowa Station in 1994,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.209, 207p., 15 refs.

This report summarizes upper atmosphere physics data acquired by the Upper Atmosphere Physics Monitoring (UAPM) System at Showa Station in 1994. The items of observation are as follows: geomagnetism; ELF-VLF waves; ionosphere (cosmic noise absorption at 30 MHz); and aurora. An outline of the system, specifications of the observation instruments, the recording periods, and the format of the compiled digital data are included. Summary plots for Jan.1-Dec. 31, 1994 are appended.

K-55218

Inan, U.S., Reising, S.C., Fishman, G.J., Horack, J.M., **On the association of terrestrial gamma-ray bursts with lightning and implications for sprites,** *Geophysical research letters,* May 1, 1996, 23(9), p.1017-1020, 18 refs.

Measurements of ELF/VLF radio atmospherics (sferics) at Palmer Station provide evidence of active thunderstorms near the inferred source regions of two different gamma-ray bursts of terrestrial origin [Fishman et al., 1994]. In one case, a relatively intense sferic occurring within ±1.5 ms of the time of the gamma-ray burst provides the first indication of a direct association of this burst with a lightning discharge. This sferic and many others launched by positive cloud-to-ground (CG) discharges and observed at Palmer during the periods studied exhibit 'slow tail' waveforms, indicative of continuing currents in the causative lightning discharges. The slow tails of these sferics are similar to those of sferics originating in positive CG discharges that are associated with sprites. (Auth.)

K-55284

Yahnin, A.G., Sergeev, V.A., **Simultaneous satellite and ground-based observations of polar cap aurora,** *Advances in space research,* 1996, 18(8), p.(8)111-(8)114, 11 refs.

On Aug. 20, 1979 (15-17 UT) sun-aligned polar cap arcs were observed at Vostok Station. Simultaneously, NOAA polar spacecraft detected in the polar cap a several hundred km wide region of electron and proton precipitation over these arcs, and a similar precipitation structure was also observed in the northern polar cap. Within these auroral precipitation regions (interpreted as a signature of the T-aurora) some >30 keV proton precipitation has been also found with intensities comparable to those in the auroral zone. These observations suggest that the T-aurora precipitation has its origin on the closed field lines of the plasma sheet. (Auth.)

K-55327

Liu, C.F., Liu, C.J., Yang, Y.H., Wang, Y., **Change characteristics of magnetic storm in antarctic Zhongshan Station and Beijing Ming Tombs Magnetic Observatory Center of China on March 24, 1991,** *Antarctic research (Chinese edition),* 1996, 8(1), p.53-58, In Chinese with English summary. 7 refs.

Change characteristics of the magnetic storm of Mar. 24, 1991 are analyzed showing different physical processes at middle-low latitudes and in the southern polar cusp region. The magnetic sudden commencements at Zhongshan Station is SC. The magnetic main phase is composed of a series of intense substorms. At Beijing Ming Tombs Magnetic Observatory Center, the magnetic sudden commencement is SC, the magnetic main phase duration is shorter and the change is greater. This event was caused by solar activities such as increases of the sunspot numbers, and the occurrence of a 3b optical flare on Mar. 22, 1991. (Auth.)

K-55369

Ichinose, M., Iwasaki, K., **HF field strength data measured at Syowa Station, Antarctica from January to December, 1994,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.213, 15p., 1 ref.

The report summarizes the results of field strength measurements of JJY 8 MHz at Showa Station for Jan.-Dec. 1994. Additional information with tabulated data is provided on observers, particulars of the transmitter and receiver, derivation of the skywave field strength, monthly tabulation sheets, and diurnal variations of the field strength.

K-55370

Iwasaki, K., Ichinose, M., **Radio observation data at Syowa Station, Antarctica during 1994,** *Japanese Antarctic Research Expedition. JARE data reports,* Mar. 1996, No.212, 197p.

Absorption of cosmic radio noise has been observed at Showa Station with a standard riometer at 30 MHz since Feb. 1966. This report presents data observed between Jan. 1 and Dec. 31, 1994. Besides the observed riometer data, other observation data are presented in the combined data plots for reference. These plots include geomagnetic field, HF, VLF, and radar observations. A bibliography relevant to riometer records of 30 MHz cosmic noise at Showa Station between 1967 and 1993 is included.

K-55371

Miyaoka, H., ed, NIPR Symposium on Upper Atmosphere Physics, 18th, Tokyo, Nov. 1-2, 1994, **Proceedings of the NIPR Symposium on Upper Atmosphere Physics, No.9,** Tokyo, National Institute of Polar Research, Feb. 1996, 86p., Refs. passim. For selected papers see K-55372 through K-55377.

This volume contains 11 selected scientific papers among 73 individual contributions presented at the 18th Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, held in Tokyo on Nov. 1-2, 1994. Three full length papers and three extended abstracts are pertinent to Antarctica and deal with observations by Polar Patrol Balloon #4; polar rain, cusp and plasma mantle; solar-terrestrial events; auroral conjugacy; and auroral modulation and ground Pi2 oscillations.

K-55372

Ebihara, Y., et al, **Convection enhancement event observed with the Polar Patrol Balloon #4,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.12-24, 14 refs.

A convection enhancement event was observed by Polar Patrol Balloon #4 which was launched at Showa Station on Dec. 26, 1992. This event occurred during 1700-1900 UT on Dec. 28, when the balloon was located in the afternoon sector of the sub-auroral zone. During this period, the amplitude of the southward electric field (E_s) increased from about 20 mV/m to 50 mV/m, and then decreased to 20 mV/m again. The northward component of the magnetic field variation (B_H) also increased from 200 nT to 600 nT, and then decreased to about 100 nT. The maximum time of E_s lagged about 12 min after the B_H maximum time (t_{BMAX}). From the ground-based data in the Southern and Northern Hemisphere and also satellite IMF data, it was concluded that this event was not an isolated disturbance confined just to the balloon location, but was a global feature of the ionospheric convection variation corresponding to the IMF fluctuation. (Auth. mod.)

K-55373

Makita, K., Ayukawa, M., **Polar cusp, plasma mantle particles and their relationships to polar rain,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.25-33, 22 refs.

On the basis of low altitude DMSP satellite particle data, characteristics of polar rain, cusp and plasma mantle are examined during an asymmetric polar rain enhancement period. Results obtained are summarized as follows: from the comparison between number flux of cusp and polar rain precipitations, the cusp flux does not increase correlatively with the increasing of polar rain flux. This result suggests that sources of precipitating particles are quite different from each other. Low energy pulsive electrons (plasma mantle) are occasionally observed in the polar rain region. These plasma mantle particles are observed in both hemispheres and the polar rain enhancement shows hemispheric asymmetry. The mixing of polar rain and plasma mantle perhaps occurred due to the movement of plasma mantle by electric field drift. (Auth.)

K-55374

Watanabe, T., **Influences of solar-terrestrial events on atmospheric environment over Syowa Station, Antarctica: a preliminary analysis of radiosonde observations,** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.42-55, 9 refs.

Radiosonde observations at Showa Station are analyzed to determine the stratospheric and tropospheric influence of solar-terrestrial phenomena in 1967-1993. Although the level of statistical significance is generally low, mean temperature changes of 1-2°C are seen after solar proton events; these include transient warming in the lower stratosphere and cooling in the troposphere. The most significant temperature changes appeared during the East phase of quasi-biennial oscillation (QBO<0). The presence of a weak correlation with the phase southern oscillation index (SOI) is also suggested. Only very low-level correlations are found for Forbush decreases of galactic cosmic rays and geomagnetic activities. (Auth.)

K-55375

Minatoya, H., Sato, N., Saemundsson, T., Yoshino, T., **Systematic analysis of auroral conjugacy: an application to periodic pulsating aurora (Extended abstract),** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.63-66, 8 refs.

Previous studies have revealed that auroras near the conjugate regions in both hemispheres do not necessarily show conjugacy. These results were obtained mainly from qualitative analyses using simultaneous all-sky images observed in both hemispheres. However, this kind of qualitative analysis does not provide a quantitative measure of the degree of conjugacy. The authors have developed an analysis system which is useful for the quantitative study of auroral conjugacy. A figure shows the analysis procedure for the present auroral conjugate study using this system. This method was applied to periodic pulsating auroral events obtained by SIT-TV cameras at the nearly geomagnetic conjugate stations of Husafell in Iceland and Showa and Asuka stations in Antarctica, during the period from 2254 to 2256 UT on Sept. 9, 1991. The locations of the conjugate stations are listed in a table. (Auth. mod.)

K-55376

Sato, N., Nagaoka, T., Saemundsson, T., **Time lag of auroral breakup in conjugate hemispheres (Extended abstract),** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.72-74, 2 refs.

The most useful method to examine how to connect the geomagnetic field lines, "mapping of geomagnetic field lines" between both hemispheres, is to use conjugate visible auroras. Using a limited data set of visible conjugate auroras, the authors found an excellent event observed by all-sky TV camera. The event occurred on Sep. 12-13, 1988 on a clear night with no moonlight interference at Showa Station and Husafell. This event is one of the best examples to examine conjugacy of small scale auroral arcs since 1984 when the Showa-Iceland conjugate campaign started. Isolated auroral arcs were observed over the zenith from the two stations. The spatial resolution of auroras hence is very high and it is easy to compare and identify one to one correspondence for the fine structure of conjugate auroras.

K-55377

Watanabe, O., Saka, O., Baker, D.N., **Comparative study of auroral modulation and ground Pi2 oscillations (Extended abstract),** NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.9, Tokyo, National Institute of Polar Research, Feb. 1996, p.79-82, 1 ref.

A comparative study was carried out to investigate the correlation between periodic drift of auroral patches and ground Pi2 oscillations during the substorm event that occurred at 2239 UT June 16, 1986. The substorm started with auroral break-up in the field-of-view of Showa Station in the pre-midnight sector in association with the ground Pi2 onset at Huancayo, Peru (1805 LT meridian). The authors found that magnetic oscillations of the ground Pi2 pulsations were correlated fairly well with a periodic westward drift of auroral patches that appeared during the diminishing phase of the Westward Traveling Surge.

K-55434

Innis, J.L., Greet, P.A., Dyson, P.L., **Fabry-Perot spectrometer observations of the auroral oval/polar cap boundary above Mawson, Antarctica,** *Journal of atmospheric and terrestrial physics,* Dec. 1996, 58(16), p.1973-1988, 31 refs.

Zenith observations of the oxygen λ630 nm auroral/airglow emission (produced at an altitude of ca. 220 to ca. 250 km) were obtained at Mawson Station with a Fabry-Perot spectrometer during three 'zenith direction only' observing campaigns in 1993. The data show many instances of strong (50 to 100 m/s) upwellings in the vertical wind, when the auroral oval is located equatorward of the zenith. The data appear consistent with the existence of a region of upwelling up to 4° poleward of the poleward boundary of the visible auroral oval, rather than short duration, explosive heating events. The upwellings are probably the vertical component of wind shear produced by reversal of the zonal thermospheric winds, which occurs near the poleward boundary of the visible auroral oval. Zenith temperature was also seen to increase when the oval was equatorward of Mawson, showing rises of up to 300 K or more. However, this increase is at times unrelated to the upwellings, and seems to be caused by the expansion of the warm polar cap over the observing site. (Auth. mod.)

K-55520

Rodger, A.S., Graham, A.C., **Diurnal and seasonal occurrence of polar patches,** *Annales geophysicae,* May 1996, 14(5), p.533-537, Refs. p.536-537.

Analysis of the diurnal and seasonal variation of polar patches, as identified in two years of HF-radar data from Halley Station during a period near sunspot maximum, shows that there is a broad maximum in occurrence centered about magnetic noon, not local noon. There are minima in occurrences near midsummer and midwinter, with maxima in occurrences between equinox and winter. In summer and winter the electron concentrations in the polar cap are high and low, respectively, but relatively unstructured. About equinox, a tongue of enhanced ionization is convected into the polar cap; this tongue is then structured by the effects of the interplanetary magnetic field, but these Halley data cannot be used to separate the various competing mechanisms for patch formation. The observed diurnal and seasonal variations in the occurrence of polar patches are largely consistent with predictions of Sojka et al. (1994) when their results are translated into the Southern Hemisphere. However, the ionospheric effects of flux transfer events are still considered essential in their formation, a feature not yet included in the Sojka model. (Auth. mod.)

K-55523

Corcuff, Y., **Trimpi events and other amplitude perturbations observed during 1991 at Kerguelen (L=3.7) on the subionospheric North-west Cape (NWC) signal,** *Journal of atmospheric and terrestrial physics,* Aug. 1996, 58(12), p.1367-1390, 49 refs.

In the period Mar.-Nov. 1991, which was characterized by strong magnetic activity, two kinds of complementary VLF data were recorded at the Kerguelen Is.: (1) the amplitude of the subionospheric 22.3 kHz signal from the Northwest Cape (NWC) transmitter in Australia, and (2) the integrated intensity in various VLF bands and broadband waveforms (0.4-10 kHz). Comprehensive analysis of the data allowed one to identify and characterize four types of well-structured perturbations in the NWC signal amplitude, i.e.: classical Trimpi events associated with whistlers; hiss-induced electron precipitation events; inverted dome-shaped events identifiable with dome-shaped events recently observed at Durban by Friedel et al. (1993); and quasi-monochromatic oscillations with a period of ≈7-15 s observed when Kerguelen is poleward of the plasmapause projection in the pre-dawn sector, similar to the zigzag effect described by Carpentër et al. (1985a). The purpose of this paper is to report on the results of investigations devoted to these various types of event; each of them is illustrated by examples. (Auth. mod.)

K-55524

Klekociuk, A.R., Burns, G.B., **Parameters of the O(^{1}S) excitation process deduced from photometer measurements of pulsating aurora,** *Journal of atmospheric and terrestrial physics,* Dec. 1995, 57(14), p.1799-1814, 23 refs.

Intensity time-series of the 427.8 nm N_2^+(1NG) (0,1) band and 557.7 nm O(^{1}S-^{1}D) line emissions were obtained at Macquarie I. with 0.05 s time resolution during intervals of pulsating aurora. Using an impulse response function analysis technique in conjunction with synthetic intensity time-series constructed using measured data, the authors estimate the influence of measurement noise and a non-linear component of the covariance between the 557.7 nm and 427.8 nm intensity time-series on the inferred parameters of an O(^{1}S) indirect excitation model. Non-linearities between the auroral emissions limit the determination of the O(^{1}S) effective lifetime by this technique. An O(^{1}S) effective lifetime distribution with a mean of 0.71 s and a sharp cut-off at the radiative lifetime of ≈0.80 s is obtained. (Auth. mod.)

K-55527

Clilverd, M.A., Thomson, N.R., Smith, A.J., **Ducted whistler-mode signals received at two widely spaced locations,** *Annales geophysicae,* June 1996, 14(6), p.619-627, Refs. p.626-627.

Whistler-mode signals from a single VLF transmitter propagating in the same duct have been observed simultaneously at Faraday Station and Dunedin, New Zealand. The signals received have group-delay times that differ on the order of 10 ms, which can be explained by the differences in Southem Hemisphere sub-ionospheric propagation time from duct exit region to receiver for the two sites. This difference has been used to determine the location of the duct exit region, with confirmation provided by arrival-bearing information from both sites. The whistler-mode signals typically occur one or two days after geomagnetic activity, with $K_p \geq 5$. The sub-ionospheric-propagation model LWPC is used to estimate the whistler-mode power radiated from the duct exit region. These results are then combined with estimated loss values for ionospheric and ducted transmission to investigate the role of wave-particle amplification or absorption. In at least half of the events studied, plasmaspheric amplification of the signals appears to be needed to explain the observed whistler-mode signal strengths. (Auth.)

K-55573

Halzen, F., Jacobsen, J.E., Zas, E., **Ultratransparent antarctic ice as a supernova detector,** *Physical review D,* June 15, 1996, 53(12), p.7359-7361, 13 refs.

The authors have simulated the response of a high energy neutrino telescope in deep antarctic ice to the stream of low energy neutrinos produced by a supemova. The passage of a large flux of MeV-energy neutrinos during a period of seconds will be detected as an excess of single counting rates in all individual optical modules. The authors update here a previous estimate of the performance of such an instrument, taking into account the recent discovery of absorption lengths of several hundred meters for near-UV photons in natural deep ice. The existing AMANDA detector thus can, even by the most conservative estimates, act as a galactic supemova watch. (Auth. mod.)

K-55586

Kato, K., **Anomaly in the orientation angle of morning side Pc5 geomagnetic pulsations observed at Syowa Station,** *Antarctic record,* Mar. 1996, 40(1), p.1-14, In Japanese with English summary. 17 refs.

The purpose of this study is to explain the anomaly in the orientation of the polarization axis of moming side Pc5 pulsations at SYOW (Showa Station) and 4 stations near SYOW, two of which are located tens of km away from SYOW and hundreds of km from the other two antarctic stations. The results are as follows: the anomaly in the orientation of polarization axis of Pc5 pulsations is large at SYOW with no local time dependence; the anomaly is related to the difference in the phase of the H and the D components. It is especially affected by the phase variations of the D component; the phase of the H component of Pc5 pulsations at SYOW shows about 10° lead and that of the D component about 30° lag. It is inferred that the origin of the anomaly of the orientation of polarization axis of Pc5 pulsations at SYOW is caused by a local effect due to inhomogeneous electric currents induced underground around SYOW. (Auth. mod.)

K-55603

Heaton, J.A.T., Jones, G.O.L., Kersley, L., **Toward ionospheric tomography in Antarctica: first steps and comparison with dynasonde observations,** *Antarctic science,* Sep. 1996, 8(3), p.297-302, 15 refs.

Total electron content (TEC) measurements obtained at two antarctic stations over 9 months, beginning early in 1994, have been analyzed as a first step to performing ionospheric tomography. Two receiving systems were deployed at the Faraday and Halley stations to monitor signals from a random selection of passes of satellites in the Navy Navigational Satellite System. The resultant measurements of total electron content have been inverted and combined with ionosonde measurements of true height and foF2 to yield two-dimensional contour maps of ionospheric electron density. In spite of the poor geometry of the observations, some 130 satellite passes were found to be suitable for reconstruction using the techniques developed for ionospheric tomography. The contour maps of plasma density have been compared with independent observations of the vertical electron density profile measured by the dynasonde ionospheric sounder at Halley. An example is presented of a deeper trough investigated by the technique, illustrating the potential of the tomographic method for study of an extended spatial region of the ionosphere over hostile terrain. (Auth.)

K-55609

Ruhl, J.E., **Search for anisotropy in the cosmic microwave background radiation,** Princeton, Princeton University, 1993, 149p., University Microfilms order No. 93-34191, Ph.D. thesis. 63 refs.

This thesis describes an instrument designed to search for medium angular scale anisotropies in the cosmic microwave background radiation, and observations made with that instrument from the South Pole. The system is an array of four bolometric detectors cooled to 50 mK, mounted on a $^3/_4$ m off-axis prime focus telescope. The detectors are sensitive to radiation near λ=3 mm. Two weeks of data were acquired, and statistically significant deviations from zero signal were found at the $\Delta T_a \approx 100\ \mu$K level. Uncertainty with possible foreground sources prevents the identification of the origin of these signals. (Auth.)

K-55610

Nguyen, H.T., **Search for small angular scale anisotropy in cosmic background radiation at 90 GHz from the South Pole,** Princeton, Princeton University, 1993, 76p., University Microfilms order No. 94-07119, Ph.D. thesis. 35 refs.

This thesis reports on a search for arc minute scale anisotropy in cosmic microwave background radiation observed from the South Pole during the austral summer 1992-93. The telescope operated with a 50 mK bolometric detector, using a single mode waveguide, over a bandwidth of 30 GHz, centered at 90 GHz, where the emission from the known celestial foreground sources is at a minimum. The differential measurement was made using a cassegrain telescope, with the subreflector spinning about the primary axis. This technique gives small offsets in the second harmonic, and is sensitive over a wide range of angular scales. Descriptions of the instrument, the observations and the data analysis are presented. The telescope reached a level of ΔT_{rms} approximately equal to 11 μK after 85 hours of integration time. (Auth.)

K-55613

Rust, D.M., Murphy, G., Strohbehn, K., Keller, C.U., **Balloon-borne polarimetry,** *Solar physics,* 1996, 164(1-2), p.403-415, 10 refs.

For about two weeks in 1995, the balloon-borne Flare Genesis Experiment (FGE) will continuously observe the sun well above the turbulent, image-blurring layers of the Earth's atmosphere. The polarization-free 80 cm telescope will supply images to a liquid-crystal based vector magnetograph, which will measure magnetic features at a resolution of 0.2 arcsec. An electrically tunable lithium-niobate Fabry-Perot provides a spectral resolution of about 0.015 nm. In a follow-up series of antarctic balloon flights, the FGE will provide unprecedented details on sunspots, flares, magnetic elements, filaments, and the quiet solar atmosphere. (Auth.)

K-55689

Smith, A.J., **Aspects of wave-particle interactions at mid-latitudes,** *Advances in space research,* 1996, 17(10), Coupling between magnetospheric and ionospheric plasmas: Proceedings of the D2.2 Meeting of COSPAR Scientific Commission D and the C1.3 Meeting of COSPAR Scientific Commission C held during the 30th COSPAR Scientific Assembly, Hamburg, Germany, 11-21 July 1994. Edited by J.U. Kozyra and C.E. Rasmussen., p.(10)213-(10)222, 46 refs.

Lightning-induced electron precipitation (LEP) and its ionospheric signature is the subject of this paper. Although LEP may be detected and studied by a variety of methods, a technique using ground-based narrowband VLF receivers to measure the Trimpi effect caused by LEP-associated ionization enhancements has become increasingly popular due to its simple instrumentation and wide field of view. Most work has concentrated on the $2<L<3$ region where conditions are most favorable for the Trimpi effect. In order to use the technique to study in detail the characteristics and distribution of LEP using a network of intersecting transmitter-receiver great-circle paths (TRGCPs), a consensus on how to interpret the observational data is crucial. Whilst most studies suggest that only LEP within ca. 200 km of the TRGCP gives rise to an observable Trimpi event, some have suggested that non-gaussian perturbations well off the TRGCP can be important. In this paper, the current state of LEP research is summarized and some recent results are presented, using data from a network of both widely and closely spaced observing sites in Antarctica. (Auth. mod.)

K-55701

Rauscher, B.J., Hereld, M., Nguyen, H.T., Severson, S., **South Pole Infrared Explorer (SPIREX): near infrared astronomy at the South Pole,** Astronomical Society of the Pacific, Conference Series, Vol.79. Robotic telescopes: current capabilities, present developments, and future prospects for automated astronomy. Proceedings of a symposium held as part of the 106th Annual Meeting of the Astronomical Society of the Pacific, Flagstaff, AZ, 28-30 June 1994. Edited by G.W. Henry, and J.A. Eaton, San Francisco, CA, USA, Astronomical Society of the Pacific, 1995, p.195-204, 2 refs.

DLC QB88.R615 1995

During the 1993-94 austral summer, the authors deployed the first generation South Pole Infrared Explorer (SPIREX) to the South Pole. The current SPIREX system consists of a 60 cm telescope, a near infrared spectrometer and imager, associated support systems, computers and software. The harsh climate at the South Pole dictates that all of SPIREX's systems be designed for remote operation. Remote operation is also necessary for the highly automated deep surveys planned to begin in 1995. Preliminary analysis of data monitored since Apr. 1994 indicates that the near infrared sky is significantly darker at the South Pole than at warm sites. This paper outlines the background measurement experiment. A future paper will provide quantitative results and analysis. In July 1994, SPIREX observed Comet Shoemaker-Levy 9's collision with Jupiter. SPIREX was unique among earth-based sites in having a nearly uninterrupted view of Jupiter during the collision period. SPIREX observed 16 impacts and obtained baseline coverage between impacts. (Auth. mod.)

K-55702

Lynch, J., et al, **Antarctic muon and neutrino detector AMANDA: first data and outlook,** Astronomical Society of the Pacific, Conference Series, Vol.79. Robotic telescopes: current capabilities, present developments, and future prospects for automated astronomy. Proceedings of a symposium held as part of the 106th Annual Meeting of the Astronomical Society of the Pacific, Flagstaff, AZ, 28-30 June 1994. Edited by G.W. Henry and J.A. Eaton, San Francisco, CA, USA, Astronomical Society of the Pacific, 1995, p.205-220, 20 refs.

DLC QB88.R615 1995

The first results are reported of the AMANDA detector (4 strings, 80 optical modules) deployed in South Pole ice at a depth of 800-1000 m during the antarctic summer, 1993-94. Details of the findings are reported here along with projected improvements in sensor placements and sensitivities. (Auth. mod.)

K-55703

Bally, J., **Astrophysics from Antarctica,** Astronomical Society of the Pacific, Conference Series, Vol.55. Optical Astronomy from the Earth and Moon: Astronomical Society of the Pacific Summer Scientific Meeting, San Diego, CA, 13-15 July, 1993. Edited by D.M. Pyper and R.J. Angione, San Francisco, CA, USA, Astronomical Society of the Pacific, 1994, p.261-262, 3 refs.

DLC QB88.A778 1993

The interior of the Antarctic Plateau is the best sub-mm and infrared site on Earth tested so far. The high altitude, isolated climatology and cold temperatures give rise to the dry atmospheric conditions needed for observations at infrared and sub-mm wavelengths. (Auth.)

K-55765

Valenziano, L., **Astronomical seeing estimation in Antarctica,** *Experimental astronomy,* 1995, 6(1-2), p.83-96, 20 refs.

A valuable seeing estimation at Terra Nova Bay is deduced from meteorological data by means of a model. A sounding balloon campaign was conducted during late spring 1993 and summer 1993-94. Based on certain assumptions, seeing is estimated in daytime and spring-summer conditions. The results obtained can be considered as 'worst case' ones and are discussed as a first step to future programs for astronomy in Antarctica. (Auth.)

K-55767

Vanina, L.B., Kokin, G.A., Kniazev, A.K., **Electron concentration and meteorological parameter variations in the ionospheric D region at Molodezhnaia Station during the proton events in October 1989,** *Geomagnetism and aeronomy,* Jan./Feb. 1995, 35(1), p.137-140, Translated from Geomagnetizm i aeronomiia. 7 refs.

Results are presented of simultaneous rocket measurements of the electron concentration, temperature, and zonal and meridional components of the stratospheric wind velocity above Molodezhnaya Station during the strong solar proton events of Oct. 1989. A sharp increase of N_e(h) above 50 km and lowering of the D region boundary down to 40 km were detected. A possible contribution is discussed of hard X rays and of solar cosmic rays in the observed effects. Anomalies in the temperature and wind regime of the stratomesosphere above Molodezhnaya were observed in the same periods as the solar proton events. (Auth.)

K-55841

Needleman, H.C., **NASA Balloon Program: conventional and long duration,** *Advances in space research,* May 1996, 17(9), p.(9)29-(9)35, 17 refs.

The U.S. National Aeronautics and Space Administraton (NASA) Balloon Program has continued to maintain its highly successful performance record in support of scientific ballooning. The Program has broadened its support for the ballooning community through the enhancement of current capabilities and the development of new capabilities. The long duration balloon project has continued to mature; the Antarctic long duration capability has been declared operational, and the successful conclusion of the development effort will be realized in the very near future with the completion of mid-latitude long duration capability. Recent years have seen increases in the number and complexity of remote campaign requirements. New ground station support equipment has been implemented, the new mobile launch vehicle has became operational, and new systems have been developed to meet the increasing demands. (Auth. mod.)

K-55842

Nishimura, J., **Activities for a long duration flight system in Japan,** *Advances in space research,* May 1996, 17(9), p.(9)45-(9)54, 8 refs.

The balloon group in the Institute of Space and Astronomical Science (ISAS) has made efforts to develop long duration balloon flight for scientific observations, such as the Boomerang Balloon system, successfully applied to scientific observations for 20 years. A recent achievement is the Satellite linked Boomerang Balloons, which recover payloads after several days of flights over the Pacific Ocean. The Polar Patrol Balloon at Antarctica has been established to perform circumpolar flights at level altitude over three weeks. The National Institute for Polar Research and ISAS have been conducting this program. Recent results of feasibility studies on Over-Pressurized Pumpkin Shaped Balloons, and of the balloons with the new film EVAL (ethylene-vinyl-alcohol) with specific IR absorptivity for long duration flights, are discussed. (Auth.)

K-55843

Spencer, S., Clark, D., Parnell, T.A., **Design and analysis of the thermal control system for the JACEE high altitude long duration balloon flight,** *Advances in space research,* May 1996, 17(9), p.(9)91-(9)94.

Computer models are used to analyze the thermal behavior of the JACEE high altitude long duration balloon flight gondola launched from the Antarctic. The antarctic flight environment presents the largest unknown factor in the models' design; albedo and solar flux result in a hot flight environment. TRASYS and SINDA thermal models were developed to calculate temperature profiles for the gondola components in this hot flight environment. A comparison of the computer-generated temperature profiles with actual flight temperatures shows a high degree of correspondence. These models can be successfully used to predict the thermal behavior of gondola components for high altitude balloon flights. (Auth.)

K-55856

Bersanelli, M., et al, **Measurements of the atmospheric emission and variations in the 1-90 GHz range,** *Planetary and space science,* Oct/Nov 1995, 43(10/11), p.1467-1472, 34 refs.

Ground-based measurements of the cosmic background radiation (CBR) are hampered by emission from atmospheric O_2 and water molecules. The authors performed multifrequency measurements of the atmospheric emission in the 1-90 GHz spectral range from two high-altitude sites (White Mountain, CA, and South Pole). A power spectrum analysis of the data shows variations of the atmospheric antenna temperature which exceed, on the time scales of a few hours or more, those expected from radiometer noise and changes in water column density. When combined with real-time measurements of the local profiles of atmospheric pressure, temperature and humidity, the results indicate variations of some 10% of the O_2 emission (both resonant and non-resonant components) on time scales of hours to days, driven by the evolution of the atmospheric pressure profile. These oxygen emission fluctuations appear significantly larger than previously expected, and may affect ground-based CBR experiments. (Auth.)

K-55879

Tian, B.N., Zhou, X.Q., **Maximum of VLF hiss occurrence in the postnoon sector at cusp latitudes,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.46-51, In Chinese with English summary. 5 refs.

The postnoon sector at cusp latitudes is often characterized by the secondary maximum of the activities or intensities of space physical phenomena, including a stronger upward field-aligned current; the maximum of downward low-energy electron stream; the maximum of upward ion flux; and the maximum of electron density in the F region. In this paper, the electric field intensity of auroral hiss at the Amundsen-Scott Station in 1986 was analyzed statistically. The relationship between the occurrence of VLF aurora hiss and Ap index was also examined. Results show a secondary maximum of occurrence of 31-38 kHz VLF emissions in the postnoon sector; they also show that the position of the maximum agrees with the abnormal plasma region, and that there is a good correlation between occurrence and the Ap index.

K-55892

Heasley, J.N., Janes, K., LaBonte, B., Guenther, D., Mickey, D., Demarque, P., **Prospect for asteroseismology from ground-based sites,** *Astronomical Society of the Pacific. Publications,* May 1996, 108(723), p.385-394, Refs. p.393-394.

The possibility of detecting p-mode oscillations in Sun-like stars with ground-based telescopes is reexamined. Previous attempts to make such observations with photometric techniques have been limited to subgiant stars in M67 and have illustrated the great difficulties involving in performing ground-based asteroseismology. Substantial gains in observing efficiency can be realized from new diagnostic techniques and improvements in instrumentation, especially with new CCD camera systems. It is shown that for appropriately selected field stars observed with a network of telescopes or at a high-duty-cycle site, it will be possible to detect p-mode oscillations from the ground. An alternative to a network of telescopes for asteroseismology would be to develop a dedicated observatory for this purpose at a high-duty-cycle site, i.e., the Amundsen-Scott Station. The authors estimate the scintillation, the main noise source in asteroseismology at the Pole, by modeling the index of refraction structure parameter from meteorological data. The model results show that at the Pole the variance of the relative intensity fluctuations—i.e., the scintillation—should be a factor of 5 smaller than at Mauna Kea. (Auth. mod.)

K-55893

Nguyen, H.T., et al, **South Pole near-infrared sky brightness,** *Astronomical Society of the Pacific. Publications,* Aug. 1996, 108(726), p.718-720, 10 refs.

The authors report their finding that the Amundsen-Scott Station is the darkest known Earth-based site for near-infrared astronomical observations. For this reason it has great potential for the most sensitive surveys of distant or faint objects. They find that the south polar sky background is substantially darker in the standard near-infrared *J, H,* and *K* filters and in an optimized K_{DARK} filter centered at 2.36 µm. In particular, the K_{DARK} background at Amundsen-Scott is only 162±67 µJy/arcsec^2 at the zenith. This is consistent with the results described in an accompanying paper by Ashley et al. (1996) and is comparable to the sky brightness measured by high-altitude balloon at 2.4 µm (Matsumoto et al. 1994). (Auth.)

K-55894

Ashley, M.C.B., et al, **South Pole observations of the near-infrared sky brightness,** *Astronomical Society of the Pacific. Publications,* Aug. 1996, 108(726), p.721-723, 15 refs.

To observe the faintest objects in the Universe astronomers require the darkest skies. In the infrared, sensitivities are limited by the thermal emission from the atmosphere and the telescope. By placing a telescope in Antarctica, and exploiting the reduced thermal emission and the natural absence of strong airglow emission between 2.3 and 2.5 µm, one can minimize the sky brightness. In this paper, and in an accompanying paper by Nguyen et al. (1996), the authors provide the first ground-based measurements of this "cosmological window." At 2.4 µm the sky flux can be as low as 50 µJy/arcsec^2, up to two orders of magnitude lower than the corresponding flux at temperate observatories. They also show that substantial reductions in the background can be achieved throughout the 2.9-4.1 µm region. (Auth.)

K-55924

Clilverd, M.A., Horne, R.B., **Ground-based evidence of latitude-dependent cyclotron absorption of whistler mode signals originating from VLF transmitters,** *Journal of geophysical research,* Feb. 1, 1996, 101(A2), p.2355-2367, 44 refs.

Results are reported of the first multisite campaign using VLF Doppler receivers to detect whistler mode signals in the South Atlantic originating from VLF transmitters in the Northern Hemisphere. The signals at 24 and 21.4 kHz were recorded by a mobile receiver on board the RRS *Bransfield* during Feb.-Mar. 1993 and by an identical system at Faraday Station. The data show that the output power of plasmaspheric ducts varies with latitude, decreasing with increasing L shell between $1.6 \leq L \leq 2.7$. The primary cause of the latitudinal variation in duct output power is absorption via cyclotron resonance with energetic electrons in the plasmasphere. The variation is due mainly to the reduction in resonant energy with increasing L shell which brings more particles into resonance with the wave. Ground-based observations of the absorption of whistler mode signals originating from VLF transmitters can be used as a new way of estimating the energetic electron flux between 1 and 40 keV inside the plasmasphere between $1.6 \leq L \leq 2.7$. (Auth. mod.)

K-55990
Japan. Ministry of Posts and Telecommunications. Communications Research Laboratory, **Ionospheric data at Syowa Station (Antarctica). Ion.Ant-44 January 1985-June 1985,** Tokyo, 1989, 122p.

DLC QC973.4.I6I59 1989

Results of vertical soundings of the ionosphere, carried out by Radio Research Laboratories at Showa Station from Jan. to June, 1985, are reported. Specifications of the ionosonde used are given; all symbols and terminology in the tables and figures of the ionospheric data presented are described.

K-56024
Jarvis, M.J., **Quasi-biennial oscillation effects in the semidiurnal tide of the antarctic lower thermosphere,** *Geophysical research letters,* Sep. 15, 1996, 23(19), p.2661-2664, 20 refs.

A continuous 37-year record of the geomagnetic field from Argentine Islands Geomagnetic Observatory at Faraday Station has been analyzed to reveal a 27-month periodicity in the amplitude of the semidiurnal Sq variation in the H-component significant at the 98% level. This indicates the presence of a periodicity in the strength of the semidiurnal tide at dynamo region altitudes matching that of the quasi-biennial oscillation classically observed in the zonal stratospheric winds at equatorial latitudes. It adds to similar observations which demonstrated such an effect in the diurnal Sq range at near-equatorial latitudes but which showed no evidence for its presence at mid-latitudes. (Auth. mod.)

K-56136
Sridharan, R., Raju, D.P., Narayanan, R., Modi, N.K., Subbaraya, B.H., Raghavarao, R., **Daytime measurements of optical auroral emissions from Antarctica,** *Current science,* Apr. 25, 1995, 68(8), p.830-834, 11 refs.

DLC Q1.C78

Optical instruments and methods used to detect auroral emissions during daytime conditions, and to identify a narrow latitudinal region of energetic particle precipitation at Maitri Station, are discussed. The energetic particles originate within the closed geomagnetic field lines near the plasmapause, and maximize about 0830 h MLT (Magnetic Local Time) (about 1200 UT). Enhanced proton precipitation activity could also be inferred during a moderate geomagnetic storm, suggesting the enhancement/activation of acceleration mechanisms during this event. (Auth. mod.)

K-56150
Gille, J.C., et al, **Accuracy and precision of cryogenic limb array etalon spectrometer (CLAES) temperature retrievals,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9583-9601, 36 refs.

The measurement technique is reviewed concentrating on aspects that affect the temperature determination. Comparison of many pairs of retrievals at the same location (near 32°N or 32°S) measured on sequential orbits (time separation of 96 min) shows a precision ranging from approximately 0.8 K at 68 mbar to about 3.5 K at 0.2 mbar, which agrees with simulations incorporating random noise and short-period spacecraft motions. Comparisons of globally analyzed CLAES data with National Meteorological Center (NMC) and U.K. Meteorological Office (UKMO) analyses show general agreement, with CLAES tending to be cooler by about 2 K, except in the tropics and high-latitude winter conditions. This is supported by comparisons with individual radiosondes and several lidars that indicate that the agreement is within 2 K throughout the profile (except for a narrow layer around 3 mbar). An error analysis also indicates that systematic errors should be roughly 2 K, independent of altitude. The systematic differences at low latitudes appear to be due to tropical waves, which have vertical wavelengths too short to be seen by the TIROS Operational Vertical Sounder (TOVS) instruments. There are no correlative rocketsondes or lidars to help resolve the reasons for the high-latitude differences. The area of surveillance extends to 75°- 80° N and S. (Auth. mod.)

K-56151
Kumer, J.B., et al, **Comparison of CLAES preliminary N_2O_5 data with correlative data and a model,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9657-9677, 39 refs.

The CLAES aboard the UARS has made near-global measurements of N_2O_5. Data for 388 days have been processed to version 7 (V7) for the period from Jan. 9, 1992 to Apr. 25, 1993. Results from UARS instruments, including CLAES and the ISAMS provide the first near-global N_2O_5 measurements. Retrieval below 3.16 mbar is adversely affected by aerosols and above 1.47 mbar by lack of signal and possible instrument effects, so data usage is recommended for just the three "UARS pressure surfaces" 3.16, 2.15 and 1.47 mbar. A comparison of the diurnal data variation with the model suggests there are offsets in the data that are to first order diurnally independent. At higher altitudes and latitudes the comparison improves and tends toward consistency with systematic error estimates that are based on instrument and retrieval process characterization and range from 14% at 3.16 mbar to 21% at 1.47 mbar. A similar estimate of random CLAES error ranges from 7% at 3.16 mbar 26% at 1.47 mbar. By comparison, the average values of the error estimates generated by the production processing algorithm at 3.16 and 1.47 mbar are 8 and 36%, respectively, and the average values derived from the observed data variability are 19 and 24%. Confidence is enhanced by the good global scale agreement and correlation of CLAES and ISAMS during an N_2O_5 enhancement event in early mid-Jan. 1992 polar winter. (Auth. mod.)

K-56152
Roche, A.E., et al, **Validation of CH_4 and N_2O measurements by the cryogenic limb array etalon spectrometer instrument on the Upper Atmosphere Research Satellite,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9679-9710, 44 refs.

CH_4 and N_2O are useful as dynamical tracers of stratospheric air transport because of their long photochemical lifetimes over a wide range of altitudes. The CLAES instrument on the UARS provided simultaneous global measurements of the altitude profiles of CH_4 and N_2O mixing ratios in the stratosphere between Oct. 1, 1991 and May 5, 1993. Data between Jan. 9, 1992 and May 5, 1993 (388 days), have been processed using version 7 data processing software, and this paper is concerned with the assessment of the quality of this data set. Each latitude was sampled 30 times per day between latitudes 34°S and 80°N, or 34°N and 80°S depending on the yaw direction of the UARS, and nearly all local times were sampled in about 36 days. This data set extends the altitude, latitude, and seasonal coverage of previous experiments, particularly in relation to measurements at high winter latitudes. Overall, the results of this validation exercise indicate that the version 7 CH_4 and N_2O data sets can be used with good confidence for quantitative and qualitative studies of stratospheric and lower-mesospheric atmospheric structure and dynamics. (Auth. mod.)

K-56153
Nightingale, R.W., et al, **Global CF_2Cl_2 measurements by UARS cryogenic limb array etalon spectrometer: validation by correlative data and a model,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9711-9736, 61 refs.

The cryogenic limb array etalon spectrometer (CLAES) onboard the Upper Atmosphere Research Satellite (UARS) has obtained the first global measurements of CF_2Cl_2 over six seasons, for which 388 days have been processed in data version 7 for the period from Jan. 9, 1992, to May 5, 1993. The CLAES measurements provide a near-global view of this stratospheric species, greatly extending the altitude, latitude, and seasonal coverage of previous measurements. This work evaluates CLAES version 7 data set quality. Overall, the results of this validation exercise indicate that the CLAES version 7 CF_2Cl_2 data set, within the limitations discussed in the paper, can be used for quantitative and qualitative studies of stratospheric structure and dynamics. Several figures and plates depict the CF_2Cl_2 mixing ratios as they pertain to the north and south polar regions. (Auth. mod.)

K-56157

Connor, B.J., et al, **Ozone in the middle atmosphere as measured by the improved stratospheric and mesospheric sounder,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9831-9841, 20 refs.

The improved stratospheric and mesospheric sounder (ISAMS) made ozone measurements in the stratosphere and mesosphere, with dense coverage over a broad range of latitudes extending from 80°N to 80°S, on about 180 days between Sep. 1991 and July 1992. Used in this paper is version 10 of the ISAMS data which is recommended for use in the pressure range 10-0.1 mbar at night and 10-1 mbar during daytime. Measurements and the retrieval algorithm are described, an error analysis is presented, and comparisons of the results to both climatological and coincident data are provided. It is demonstrated that biases with respect to other well-validated sets are less than 10%, which is well within the internal assessment of systematic errors.

K-56158

Remedios, J.J., et al, **Measurements of methane and nitrous oxide distributions by the improved stratospheric and mesospheric sounder: retrieval and validation,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9843-9871, 45 refs.

This paper describes the measurement technique, the current retrieval scheme (version 10), and the data set produced. The version 10 data set comprises typically 2600 profiles/d on 180 days between Sep. 26, 1991, and July 29, 1992. Retrieved profiles extend in altitude from 7 mbar to 0.08 mbar for methane and from 7 mbar to 0.8 mbar for nitrous oxide. The precision of the data is better than 20% over much of the range and estimated systematic uncertainties are less than 30%. Comparisons with coincident measurements show that the systematic uncertainties are a reasonable estimate for the methane data but reveal a much larger positive bias for the nitrous oxide data relative to other measurements. Accounting for aerosol contamination effects and a priori biases, ISAMS methane data are recommended for use in scientific studies at altitudes between 7 mbar (5 mbar in the tropics) and 0.1 mbar. ISAMS nitrous oxide data are recommended for use between 7 mbar and 1.0 mbar where relative rather than absolute values are required. Graph presentations extend the latitudinal data coverage from 80°S to 80°N. (Auth. mod.)

K-56159

Fishbein, E.F., et al, **Validation of UARS microwave limb sounder temperature and pressure measurements,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.9983-10,016, 43 refs.

Temperatures and tangent-point pressure are retrieved from a 15-channel 63-GHz radiometer measuring O_2 microwave emissions from the stratosphere and mesosphere. The Version 3 data (first public release) contains scientifically useful temperatures from 22 to 0.46 hPa. Accuracy estimates are based on instrument performance, spectroscopic uncertainty and retrieval numerics. Temperature accuracy is limited mainly by uncertainty in instrument characterization, and tangent-point pressure accuracy is limited mainly by the accuracy of spectroscopic parameters. Precisions are around 1 K and 100 m. Comparisons are presented among temperatures from MLS and several stations in the US and France. Problems with Version 3 MLS temperatures and tangent-point pressures are identified, but the high precision of MLS radiances will allow improvements with better algorithms planned for the future. Several of the plates present data measured at arctic and antarctic latitudes. (Auth. mod.)

K-56160

Froidevaux, L., et al, **Validation of UARS microwave limb sounder ozone measurements,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,017-10,060, 39 refs.

The MLS ozone retrievals are obtained from the calibrated microwave radiances (emission spectra) in two separate bands, at frequencies near 205 and 183 GHz. Analyses focus on the MLS Version 3 data. Described are results of simulations performed to assess the quality of the retrieval algorithms, in terms of both mixing ratio and radiance closure. From actual MLS observations, the 205-GHz ozone retrievals give better closure (smaller radiance residuals) than that from the 183-GHz measurements and should be considered more accurate from the calibration aspects. However, the 183-GHz data are less noise limited in the mesosphere and can provide the most useful scientific results in that region. The retrieved 205-GHz ozone profiles in the middle-to lower stratosphere are compared to ozonesonde measurements at a wide range of latitudes and seasons; various plates include data for arctic and antarctic latitudes. Ground-based lidar data from Table Mountain, CA, provide a good reference for comparisons at higher altitudes. Based on these analyses and other factors, MLS results appear to be generally of high quality, with some biases worth mentioning. Results for the lowermost stratosphere are still in need of improvement. A set of estimated precision and accuracy values is derived for the MLS ozone data sets. (Auth. mod.)

K-56161

Waters, J.W., et al, **Validation of UARS Microwave Limb Sounder ClO measurements,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,091-10,127, 101 refs.

Credibility of the measurements is establised by (1) the consistency of the measured ClO spectral emission line with the retrieved ClO profiles and (2) comparisons of ClO from MLS with that from correlative measurements by balloon-based, ground-based, and aircraft-based instruments. Values of "noise" (random), "scaling" (multiplicative), and "bias" (additive) uncertainties are determined for the Version 3 data, the first version publicly released, and known artifacts in these data are identified. Comparisons with correlative measurements indicate agreement to within the combined uncertainties expected for MLS and the other measurements being compared. It is concluded that MLS Version 3 ClO data, with proper consideration of the uncertainties and "quality" parameters produced with these data, can be used for scientific analyses at retrieval surfaces between 46 and 1 hPa (approximately 20-50 km in height). Future work is planned to correct known problems in the data and improve their quality. Various plates and figures contain data for arctic and antarctic latitudes and diagrams of ClO profiles over McMurdo Station and Thule, Greenland are included. (Auth. mod.)

K-56162

Lahoz, W.A., et al, **Validation of UARS microwave limb sounder 183 Ghz H_2O measurements,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,129-10,149, 30 refs.

Measurements of thermal emission are used to infer the concentration of water vapor over a pressure range of 46-0.2 hPa (≈20 to ≈60 km). It is estimated that version 3 MLS H_2O retrievals are accurate to within 20-25% in the lower stratosphere and to within 8-13% in the upper stratosphere and lower mesosphere. The precision of a single profile is estimated to be ≈0.15 ppmv in the mid-stratosphere and 0.2 ppmv in the lower and upper stratosphere. In the lower mesosphere the estimate of a single profile precision is 0.25-0.45 ppmv. During polar winter conditions, H_2O retrievals at 46 hPa can have a substantial contribution from climatology. The vertical resolution of MLS H_2O retrievals is ≈5 km. Specified figures show data at 60°-80°N and S. (Auth. mod.)

K-56163

Russell, J.R., III, et al, **Validation of hydrogen fluoride measurements made by the Halogen Occultation Experiment from the UARS platform,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,163-10,174, 31 refs.

This paper describes the characteristics of and data from the Halogen Occultation Experiment (HALOE) HF channel, including steps taken to validate the results. The on-orbit precision of the HF measurements is shown to be better than 0.04 ppbv to 0.06 ppbv throughout the stratosphere. The estimated accuracy is 14% to 27% depending on altitude. The internal consistency of the HF measurements is excellent as judged by sunrise/sunset differences and comparison with HALOE CH_4 distributions. The mean difference between HALOE HF and correlative balloon underflight measurements is <7% from mbar to 50 mbar. Analysis of HALOE HF pressure versus longitude cross sections shows that obtaining close space and time coincidence can be very important in comparing tracer distributions. Typical characteristics of a pressure versus latitude cross section and polar orthographic projection are also discussed. Comparisons with latitudinal distributions of tracer measurements from previous experiments show similar features like the tropical double minimum due to the semiannual oscillation. All comparisons and analyses conducted provide good confidence in the validity of the HALOE HF results. Tables, plates, and figures show data for arctic and antarctic latitudes. (Auth. mod.)

K-56164

Park, J.H., **Validation of Halogen Occultation Experiment CH_4 measurements from the UARS,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,183-10,203, 22 refs.

CH_4 mixing ratio is obtained using the gas filter correlation technique operating in the 3.3 μm region. Since measurements are made during solar occultation in the 57° inclination orbit, data are collected 15 times daily for both sunrises and sunsets. This provides coverage of one hemisphere in a month period. One complete hemispheric sweep from equator to ≈80° latitude is made during the spring and summer seasons of two hemispheres, and partial sweep from equator to around 50° latitude is made during the fall and winter seasons of two hemispheres. HALOE CH_4 measurements are validated using direct comparisons with correlative data and internal consistency checks using other HALOE-measured tracers, HF, and aerosols. It is estimated fro the 0.3- to 50-mbar region that the total error, including systematic and random components, is less than 15% and that the precision is better than 7%. Simultaneous mesurements of CH_4 and other HALOE species and aerosol extinction coefficients provide important information on atmospheric dynamic and chemical processes, since CH_4 can be used as a tracer and an indicator of atmospheric transport processes. Several new pieces of information on previously unreported HALOE-observed features are also presented. Figures and plates show the range of latitude for data extending into the polar regions of both hemispheres. (Auth. mod.)

K-56165

Harries, J.E., et al, **Validation of measurements of water vapor from the Halogen Occultation Experiment (HALOE),** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,205-10,216, 24 refs.

Measurements are made of the transmittance of the atmosphere in a number of spectral channels as the Sun rises or sets behind the limb of the atmosphere. One of the channels, at 6.60 μm, is a broadband filter channel tuned to detect absorption in the ν_2 band of water vapor. This paper describes efforts to validate the absolute and relative uncertainties (accuracy and precision) of the measurements from this channel. The HALOE data have been compared with independent measurements, using a variety of observational techniques, from balloons, from the ground, and from other space missions, and with the results of a two-dimensional model. The results show that HALOE is providing global measurements throughout the stratosphere and mesosphere with an accuracy within ±10% over most of this height range, and to within ±30% at the boundaries, and to a precision in the lower stratosphere of a few percent. The observed systematic behavior and internal consistency of the HALOE data, coupled with these estimates of their accuracy, indicate that the data may be used for quantitative tests of the understanding of the physical and chemical processes which control the concentration of H_2O in the middle atmosphere. Textual references, figures, and plates show measured data in both northern and southern polar regions. (Auth. mod.)

K-56166

Brühl, C., et al, **Halogen Occultation Experiment ozone channel validation,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,217-10,240, 32 refs.

The HALOE instrument on UARS observes vertical profiles of ozone and other gases of interest for atmospheric chemistry using the solar occultation technique. A broadband radiometer in the 9.6 μm band is used for ozone measurements. Version 17 ozone retrieved by HALOE is intercompared successfully with about 400 profiles of other sounders, including ozonesondes, lidars, balloons, rocketsondes, and other satellites. Usually, the HALOE data are within the error range of the correlative measurements between about 100 and 0.03 mbar atmospheric pressure. Between about 30 and 1 mbar, HALOE agrees typically within 5%, with a tendency to be low. In the first year of data, larger errors sometimes occur in the lower stratosphere due to the necessary correction for Pinatubo aerosol effects, but these differences do not exceed 20%. The data show internal consistency for sunrise and sunset events at the same locations. Some examples of observed ozone distributions, including both polar regions, are given. (Auth. mod.)

K-56167

Manney, G.L., et al, **Comparison of U.K. Meteorological Office and U.S. National Meteorological Center stratospheric analyses during northern and southern winter,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,311-10,334, 27 refs.

Both UKMO and NMC analyses capture the large-scale evolution of the stratospheric circulation during Northern Hemisphere (NH) and Southern Hemisphere (SH) winters. Stronger vertical and horizontal temperature gradients develop in the UKMO than in the NMC data during stratospheric warmings; comparison with satellite measurements with better vertical resolution suggests that the stronger vertical temperature gradients are more realistic. The NH polar vortex is slightly stronger in the UKMO analyses than in the NMC in the middle and upper stratosphere, and midstratospheric temperatures are slightly lower. The SH polar vortex as represented in the UKMO analyses is stronger and colder in the midstratosphere than its representation in the NMC analyses. The UKMO analyses on occasion exhibit some difficulties in representing cross-polar flow or changes in curvature of the wind field at very high latitudes. In addition to the above study of two wintertime periods, a more detailed comparison of lower-stratospheric temperatures is done for all arctic and antarctic winter periods since the launch of the UARS. (Auth. mod.)

K-56168

Cunnold, D.M., Froidevaux, L., Russell, J.M., Connor, B.J., Roche, A., **Overview of UARS ozone validation based primarily on intercomparisons among UARS and Stratospheric Aerosol and Gas Experiment II measurements,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,335-10,350, 16 refs.

Comparisons of data were made from the measurements by UARS instruments, i.e., MLS, CLAES, ISAMS, and HALOE, against those measured by SAGE II. No consistent patterns were noted in which the UARS data were similar to those of SAGE II or differed to the same degree in similar locations during the same seasons. Rather, seasonal and latitudinal differences in varying amounts seemed to be the norms. Data from both polar regions are reported. (Auth. mod.)

K-56169

McLandress, C., Shepherd, G.G., Solheim, B.H., Burrage, M.D., Hays, P.B., Skinner, W.R., **Combined mesosphere/thermosphere winds using WINDII and HRDI data from the Upper Atmosphere Research Satellite,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,441-10,453, 20 refs.

The data analyzed cover from Feb. 1992 to Feb. 1994 and consist of both day and nighttime WINDII winds obtained from the $O(^1S)$ green line emission and mesosphere/lower thermosphere daytime HRDI winds from the O_3 atmospheric band. The combination of the WINDII and HRDI data sets is first justified by comparing all the data in the lower-thermosphere overlap region for days and orbits when both instruments were observing the same volume of atmosphere. This comparison shows good agreement between the two instruments. An analysis of the combined WINDII and HRDI winds during equinox and solstice periods is then performed. The amplification with height of the diurnal tide at equinox and its subseqeunt decay in the lower thermosphere are clearly demonstrated by the observations. The corresponding background (i.e., diurnal mean) zonal wind component exhibits a broad region of easterlies at lower latitudes in the upper mesosphere and lower thermosphere and westerlies at mid-latitudes. Above 120 km the mean winds revert to easterlies in the zonal component and a two-celled equator to pole meridional circulation. (Auth. mod.)

K-56170

Fleming, E.L., et al, **Climatological mean wind observations from the UARS high-resolution Doppler imager and wind imaging interferometer: comparison with current reference tools,** *Journal of geophysical research,* Apr. 30, 1996, 101(D6), p.10,455-10,473, 58 refs.

The authors have used 2-3 years of UARS HRDI and WINDII observations to construct a monthly and diurnal mean zonally averaged climatology of zonal and meridional wind for the 50- to 120-km region, and to compare with the current CIRA-86 and HWM-93 reference models. Comparisons are limited to regions where the tidal oscillations can be adequately removed from the UARS observations using simple binning and averaging methods. At 50-80 km the reference models, which are based on gradient winds derived from temperatures, compare well with the HRDI data in reproducing the overall seasonal variations, including the magnitudes and positions of the winter westerly and summer easterly jets at mid-latitudes. At 95 km, HRDI and WINDII show year-round easterlies at low latitudes and indicate a strong westerly jet during summer and weaker, more variable flow during winter at mid-latitudes. The CIRA-86 gradient winds at 95 km show some qualitative agreement with the UARS data at mid-latitudes, especially in simulating the summertime jet. However, the comparison is poor at low latitudes. Although the main focus of these comparisons is on the mid-latitudes, several of the figures contain data for both polar regions. (Auth. mod.)

K-56273

Storey, J.W.V., **Beyond the South Pole,** Amazing light: a volume dedicated to Charles Hard Townes on his 80th birthday, edited by R.Y. Chiao, New York, Springer-Verlag, 1996, p.613-619, 9 refs.

DLC QC685.A43 1996

In one of the 64 papers comprising this Festschrift to Charles Hard Townes, the several advantages of Antarctica, generally, and the South Pole, particularly, are recounted, with the extremely dry atmosphere being the major consideration. Other antarctic sites are noted: Vostok, and Domes A and C, all of which are at higher elevations than Amundsen-Scott, which has the singular advantage of being the most logistically accessible. Several of the programs and projects for antarctic astronomical research are noted: Automated Geophysical Observatory, adapted for astronomical research; Automated Astronomical Site-Testing Observatory (AASTO); near infrared sky monitor; mid-infrared transmission and sky brightness monitor; the UV/visible sky monitor. Plans are being developed for an AASTO set-up at Amundsen-Scott Station and eventually to be established at Dome C, probably the best but least accessible submillimeter site on earth.

K-56335

Vitt, F.M., Jackman, C.H., **Atmospheric ionization by solar particles detected by nitrate measurements in antarctic snow. FY91 AASERT,** *U.S. Air Force Office of Scientific Research. Technical report,* Nov. 1995, AFOSR-TR-96-0223, 37p., ADA-308 179, Refs. p.18-22.

The odd nitrogen source strengths associated with solar proton events (SPEs), galactic cosmic rays (GCRs), and the oxidation of nitrous oxide in the Earth's middle atmosphere from 1974 through 1993 have been compared globally, at middle and lower latitudes (<50°), and polar regions (>50°) with a two-dimensional (2-D) photochemical transport model. As discovered previously, the oxidation of nitrous oxide dominates the global odd nitrogen source while GCRs and SPEs are significant at polar latitudes. The horizontal transport of odd nitrogen, produced by the oxidation of nitrous oxide at latitudes <50°, was found to be the dominant source of odd nitrogen in the polar regions with GCRs contributing substantially during the entire solar cycle. The source of odd nitrogen from SPEs was more sporadic; however, contributions during several years (mostly near solar maximum) were significant in the polar middle atmosphere. (Auth.)

See also:

A-55704 A-56149 E-55950 F-54065 F-55629 G-54783 G-55954
I-54644 I-54671 I-54855 I-55509 I-56154 I-56155 I-56156

L. TERRESTRIAL PHYSICS

L-54046

Kanao, M., Kaminuma, K., **Detection capability of earthquakes recorded at Syowa Station, Antarctica, from 1987 to 1993,** *Antarctic record,* July 1995, 39(2), p.156-169, With Japanese summary. 20 refs.

Phase readings of teleseismic earthquakes at Showa Station have been carried out since 1967 by use of analog records of three-component short- and long-period seismometers. Seismic observations and phase readings have been conducted by the wintering members of the Japanese Antarctic Research Expedition (JARE). The arrival times of *P*-waves were reported to the United States Geological Survey (USGS) and the International Seismological Center (ISC), then published as the "JARE Data Reports (Seismology)" by the National Institute of Polar Research (NIPR). In recent years, the quality of chart records has improved by the advance of electronics. In this paper, the hypocentral distribution of the detected earthquakes for the period from 1987 to 1993 is presented, and the spatial distribution and time variations for epicentral parameters are investigated. The detection capability of earthquakes is discussed in relation to the report from ISC data. (Auth.)

L-54075

Dibble, R.R., Kyle, P.R., Skov, M.J., **Volcanic activity and seismicity of Mount Erebus, 1986-1994,** *Antarctic journal of the United States,* 1994, 29(5), p.11-14, 4 refs.

Mount Erebus, a 3,794-m high active volcano on Ross I., has a permanent lake of molten anorthoclase phonolite magma in its inner crater. A 3-month period of sustained large strombolian eruptions starting in Sep. 1984 buried the lake and ejected over 100,000 cu m of phonolite bombs and other ejecta. Since 1985, when the lava lake was exhumed, small strombolian eruptions have occurred at rates of between 0 and at least 8 per day. Between Dec. 1986 and Dec. 1990, Victoria University of Wellington maintained surveillance of the lava lake (when cloud and solar battery power allowed) from a videocamera situated on the north rim of the main crater. The video signal was radioed to Scott Base using a television transmitter where it was recorded on videotape. Brief descriptions of the volcanic activity, and changes in the lava lake recorded using the video monitoring system and ground-based surveillance made during austral summer field seasons, are presented.

L-54077

Cooper, A.K., Cochrane, G., Zhang, J., Brancolini, G., Pellis, G., Egloff, F., **Antarctic crustal profile seismic project, Ross Sea, Antarctica,** *Antarctic journal of the United States,* 1994, 29(5), p.15-18, 9 refs.

The antarctic crustal profile (ACRUP) project is a multinational seismic experiment that was conducted in the Ross Sea area during the 1993-94 austral summer under the auspices of the Italian National Research Antarctic Program (PNRA). Scientists from 5 research institutes in Italy, 2 in Germany, and 2 in the United States participated in the experiment. This article provides a brief overview of the project and some preliminary results. The objective of the ACRUP project was to record large-offset seismic and other geophysical data along a 400 km transect across the tectonic boundary between East and West Antarctica to study the deep crustal structure of the Transantarctic Mountains and adjacent Victoria Land basin in the western Ross Sea.

L-54602

Hao, X.H., Xu, H.Z., Lü, C.C., **Analysis of gravity tides observation at Zhongshan Station in Antarctica,** *Antarctic research (Chinese edition),* 1995, 7(3), p.109-112, In Chinese with English summary. 5 refs.

Using a Lacoste ET gravimeter (No.20), the authors observed the gravity tide from Mar. 1991 to Feb. 1993 at Zhongshan Station and obtained effective data for more than 600 days. After correction for ocean effects and the rheological model of the gravimeter, they found the following: $\delta o_1 = 1.2253 \pm 0.0031$; $\phi o_1 = 0.73° \pm 0.14°$; $\delta m_2 = 1.0785 \pm 0.0045$; $\phi m_2 = -3.55° \pm 0.29°$. (Auth. mod.)

L-54613

Kanao, M., Akamatsu, J., **Shear wave *Q* structure for the lithosphere in the Lützow-Holm Bay region, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.1-14, 26 refs.

Seismic wave attenuation in the lithosphere has been studied in various regions by the analysis of coda amplitudes of *S*-waves for local earthquakes. On the basis of the observed facts, the attenuation factor of coda waves (Q_c) is assumed to reflect the averaged Q for *S*-waves (Q_s) in an area within the ellipsoid of the scattering medium in the lithosphere. In this study, layered models of Q_s for the lithosphere in 2 tectonically different regions of shield and island arc were estimated from the observed Q_c at the various lapse times defined as 'time origin of earthquake'. For the representative of stable shield regions, 5 shallow earthquakes observed with a local telemetry seismic network around the Lützow-Holm Bay region were re-analyzed to calculate Q_c for the lapse time ranging from 20s to 70s in the 4, 8 and 16 Hz frequency bands. (Auth. mod.)

L-54614

Akamatsu, J., Kaku, H., Kanao, M., **Coda *Q* of local earthquakes observed on the southeast Tibetan Plateau: comparison with Lützow-Holm Bay region, East Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.15-24, 16 refs.

Coda Q of local earthquakes observed at Bomi, southeast Tibetan Plateau was evaluated using a single scattering model and compared with that in the Lützow-Holm Bay region. The results are: Q^{-1} for short lapse time (SLT) from 5 to 50s shows large dependence on frequency; Q^{-1} for SLT in the Tibetan plateau region is larger than that in the Lützow-Holm Bay region; Q^{-1} for long lapse time from 80 to 160s in the Tibetan region is nearly the same as that in Lützow-Holm Bay. Although there is a need for discussion of coda excitation modeling, all these features are consistent with the general relation between coda Q and regional tectonic activities. (Auth.)

L-54615

Kubo, A., Hiramatsu, Y., Kanao, M., Ando, M., Terashima, T., **Analysis of the SKS splitting at Syowa Station in Antarctica,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.25-34, 26 refs.

To reveal the seismic anisotropy of the crust and mantle beneath East Antarctica, the authors conducted a shear wave splitting analysis of SKS waves using STS seismograms at Showa Station. The average direction of the fast shear wave was N49°E and the delay time was 0.7s, which was larger than the crustal values in other regions. On the origin of anisotropy in relation to large delay time, 3 possible mantle flows are considered: present asthenospheric flow due to the plate motion; paleo mantle flow related to Gondwana breakup; and paleo mantle flow that has formed progressive metamorphism and foldings of the Lützow-Holm Complex in the Late Proterozoic. Neither the direction of present absolute plate motion (N120°E) nor the direction of first breakup of Gondwana at Showa Station (NW-SE) coincides with the observed direction of anisotropy. From metamorphic studies, the compressional event related to progressive metamorphism has been recognized. The peak metamorphism has been observed along the thermal axis trending NW-SE. Other geologic fabrics around Showa Station also show that this area has undergone NE-SW compression. (Auth. mod.)

L-54616

Kaminuma, K., **Seismicity around the Antarctic Peninsula,** NIPR Symposium on Antarctic Geosciences, Proceedings, Tokyo, National Institute of Polar Research, Oct. 1995, p.35-42, 15 refs.

Seismic activity in the vicinity of the South Shetland Is. is very high compared with other regions of the Antarctic. A study of International Seismological Center data between 45-70°W and 55-72°S, covering the 1979-1990 time period, verifies this conclusion. Earthquakes have been located along the South Scotia Ridge, the Shackleton Fracture Zone, the Hero Fracture Zone and the South Shetland Is. The earthquakes in the South Shetlands are concentrated on Deception and Bridgeman islands, both volcanic islands on either side of the Bransfield Rift. No seismic evidence is recognized along the Bransfield Rift, and very little along the South Shetland Trench. It can be concluded that neither subduction nor rifting is active in this region at present. (Auth.)

L-54899

Miller, H., ed, Grobe, H., ed, **Expedition ANTARKTIS-XI/3 of *Polarstern* in 1994** [Die Expedition ANTARKTIS-XI/3 mit FS *Polarstern* 1994], *Berichte zur Polarforschung,* 1996, No.188, 115p., In German (some segments in English) with English summary.

The main objective of this leg was marine geophysical research to study the crustal structure at the western margin of the antarctic continent. This was achieved by combined land-sea deep seismic sounding experiments using recording instruments on the inland ice as well as ocean bottom seismographs. At the same time multichannel seismic reflection lines were observed over the shelf and the adjacent deep sea areas in order to resolve the sedimentary cover and to gain an understanding of the depositional history, especially during the Cenozoic. While the deep seismic sounding experiments were part of the ANTALITH Project, the studies of the sedimentary cover also increased the understanding of the history of antarctic glaciation, since the major advance and retreat stages are documented in the sediments. (Auth. mod.)

L-54934

Vigliotti, L., **Paleomagnetic investigations in Victoria Land,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.16.

This paleomagnetic research in Antarctica is focused on the project "Paleomagnetic study of Victoria Land in the framework of the Gondwana Supercontinent" with the aim to investigate apparent polar wander path (APWP) of the Antarctic Plate. During the X Italian expedition, paleomagnetic sampling was carried out on Mesozoic and Tertiary rocks outcropping in northern and southern Victoria Land. Early Pleistocene volcanics were sampled at Shield Nunatak to study the behavior of the magnetic field during the transition occurring in a change of polarity. According to the radiometric age (1.61-1.74 Ma), the mugearitic lava flows of Shield Nunatak should be emplaced close to the transition between the Olduvai and the Matuyama chrons (1.75 Ma).

L-54936

Caneva, G., Gambetta, M., Damaske, D., **Gravity survey in the Lanterman Range area,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.18-21, 6 refs.

Instruments used in gravimetric surveys of the Lanterman Range during the 1994-1995 Italian expedition, and the locations of gravimetric stations, with readings and dates, are discussed and shown in tables.

L-54937

Caneva, G., Gambetta, M., **Magnetovariational stations in the Lanterman Range and Sheehan Mesa: an extension of the GDS network in northern Victoria Land,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.22-23, 3 refs.

The magnetovariational temporary stations installed during the 1986-1989 Italian antarctic expeditions established the first "nonsimultaneous array" in Victoria Land. The magnetovariational data were processed using a GDS (Geomagnetic Deep Sounding) approach to obtain information on electrical conductivity of litho-asthenospheric structures in this area. During the 1994-95 campaign, two new three-component fluxgate magnetometers (EDA 100B) were installed in order to extend the investigated area and to obtain new data to check the applicability range of the adopted techniques.

L-54938

Caneva, G., Gambetta, M., Chiappini, M., Damaske, D., **High resolution aeromagnetic survey (GITARA 4) in the Cape Roberts-drilling project area,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.24-26, 5 refs.

Aeromagnetic investigations during the X ItaliAntartide 1994-95 expedition were carried out in the Cape Roberts drilling area by the Italian-German team GITARA 4, in the international frame of the Cape Roberts Drilling Project (CRDP) supported by New Zealand, USA, UK, Italy and Germany. The survey began on Dec. 2 and ended on Dec. 6, 1994. The parameters and preliminary statistics are discussed and shown in tables. A preliminary plot of positioning of survey lines is shown in a figure.

L-54950

Romeo, G., Cerrone, M., Chiappini, M., Morelli, A., **Seismic observatory in Terra Nova,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.60-62, 3 refs.

Installed in 1989, the very-broadband (VBB) seismographic station in Terra Nova Bay is a remotely-controlled, unmanned automatic station which provides continuous and triggered recording of very broadband and short period data. The station produces data useful for global studies (VBB data) and local seismology (short period data). The technical problems which were solved and the current configuration of the station are described. The importance of the Terra Nova Station derives from its unique location and its advanced instrument characteristics. The station is part of the primary network of the Federation of Digital Seismograph Stations (FDSN). Data are collected and shared with other institutions in the FDSN.

L-54951

Russi, M., Marino, B., **Broad band seismology in the Scotia Arc: the Esperanza and the Ushuaia seismographic stations,** Italian Antarctic Research Programme. Earth Sciences. X ItaliAntartide Expedition, 1994-95: field data reports, Siena, Sep. 1995, p.63-64.

The development of the Italian project for the establishment and subsequent exploitation of a Scotia Region broadband seismographic network began in 1992 when a three component broadband station was installed at the Esperanza Station. The station was upgraded during Jan. and Feb. 1993. The complete renewal of the Esperanza Station instrumentation and the installation of a second broadband station at Ushuaia are reported. Each station consists of a 6 channel, fully PASCAL compatible, 24 bit Reftek 72-08 digital seismograph, connected to a three component broadband CMG-3T seismometer with a flat frequency response from 0.01 to 50 Hz. The time signal is provided by a GPS receiver. Data are recorded on an external 500 Mbyte SCSI disk drive and a DAT tape recorder is used to backup the recordings on 1.3 gigabyte cassettes.

L-54959

Shumilov, A.V., **Using group explosions on the surface of antarctic glaciers during deep seismic sounding research** [Opyt ispol'zovaniia gruppovykh vzryvov s poverkhnosti lednikov Antarktidy pri issledovaniiakh metodom GSZ], *Antarktika,* 1993, No.32, p.36-40, In Russian with English summary. 3 refs.

An original method for calculating group charges to induce seismic waves in loose snowy neve parts of antarctic glaciers is described. The experiments have shown that this method can provide a substantially increased intensity of useful seismic waves and determine the charge necessary for recording seismic waves at appropriate distances from the source. Following the given method, charges may be placed in shallow holes up to 15 m deep, substantially simplifying the complex technology of preparing powerful explosions on antarctic glaciers. This method can also be used in other parts of the world having unfavorable conditions for inducing seismic fluctuations due to loose sediments. (Auth.)

L-54969

Kowalski, T., Górski, M., **Arctowski Antarctic Station (AAS), 1988-1991,** *Polish Academy of Sciences. Institute of Geophysics. Publications,* 1993, B-15(258), p.3-49, 3 refs.

The bulletin contains a list of local earthquakes recorded at the Arctowski Station from Jan. 1, 1988 through Dec. 31, 1991. The seismological station has been operating since Mar. 1978. At the beginning of 1988, a new instrument for the recording of local earthquakes was installed at the station. It consists of a short-period instrument RK1c, connected with an RRO1/82 LP recorder and SM3 seismometers (three components). The recording of seismic signals is made in a continuous manner on paper. The time is provided from an external clock, the rate of which is compared with signals from a time signals broadcasting station. Universal Time (UT) is used. Details of the recording process are given.

L-54996

Ito, K., Kanao, M., **Detection of reflected waves from the lower crust on Mizuho Plateau, East Antarctica,** *Antarctic record,* Nov. 1995, 39(3), p.233-242, With Japanese summary. Refs. p.241-242.

A reflective lower crust has been found in some regions of Phanerozoic orogens. Seismic refraction data from explosion experiments during the 21st Japanese Antarctic Research Expedition (JARE-21) in 1981 were re-analyzed to detect reflected waves from the lower crust. An explosion in Lützow-Holm Bay with 3000 kg of explosive gave well-recorded seismic waves at 27 stations along a 300 km profile on the northern Mizuho Plateau. A band-pass filtered record section with a normal-moveout velocity of 6.3 km/s shows clear phases of large amplitudes in a range of 8-16 s of two-way travel time; these phases can be considered as wide-angle reflected waves from the lower crust. The reflection depths correspond to about 18-48 km. The depth patterns of reflective layers on the Mizuho Plateau can be related to the Bouguer gravity anomalies and are useful for studying the evolution of the Lützow-Holm Complex. (Auth.)

L-54997

Shibuya, K., Nogi, Y., Takenaka, J., **Gridded data of MAGSAT crustal magnetic anomalies in the antarctic region,** *Antarctic record,* Nov. 1995, 39(3), p.243-251, With Japanese summary. 5 refs.

Crustal magnetic anomalies in the antarctic region were obtained by applying the Mean Polar Disturbance Field (MPDF) method. The authors generated 1° x 1° grid data sets from their original 3° x 3° mesh data, using the GMT program. These data sets were prepared under an anonymous ftp site from the workstation at the Center for Antarctic Environment Monitoring (CAEM) of the National Institute of Polar Research and made accessible to users. (Auth.)

L-55000

Kanao, M., Kaminuma, K., Shibuya, K., Nogi, Y., **Transfer, archives and public use of digital data for solid earth geophysics at Syowa Station, Antarctica by computer network,** *Antarctic record,* Nov. 1995, 39(3), p.303-320, In Japanese with English summary. 16 refs.

Data transmission of solid earth geophysics between Showa Station and the National Institute of Polar Research (NIPR) was successfully carried out by JARE-34 in 1993 via the INMARSAT satellite telecommunication system. In 1994, data transmission from the Earth Science Laboratory (ESL) was carried out by JARE-35 using UUCP (Unix-to-Unix Copy) protocol for the file transfer. E-mail services were started by JARE-36 in May 1995. In this paper, the data transmission between Showa Station and NIPR, the data archives in the UNIX workstation, and data release using the other antarctic stations are also discussed. (Auth. mod.)

L-55008

Nawa, K., Kanao, M., **Seismological bulletin of Syowa Station, Antarctica, 1994,** *Japanese Antarctic Research Expedition. JARE data reports,* Feb. 1996, No.210, 84p., 7 refs.

The observation system at Showa Station is shown in a schematic diagram; the frequency responses of the seismometers and epicenter locations of seismic events recorded at Showa Station are shown in graphs and charts; the arrival-time data are listed, as are the corresponding hypocenters of 727 teleseismic events detected at Showa Station between Jan. 1 and Dec. 29, 1994. An appendix contains examples of digital waveforms on the BRB outputs for 37 events.

L-55030

Houston, H., **Correction to: "Broadband source spectrum, seismic energy, and stress drop of the 1989 Macquarie Ridge earthquake",** *Geophysical research letters,* Sep. 1990, 17(10), p.1801, 1 ref. For relevant paper see 18L-42307.

The author offers corrections for a previous paper.

L-55058

Redfield, T.F., **Transantarctic Mountains of northern Victoria Land: underplating, episodic uplift, and flexural suppression,** Tempe, Arizona State University, 1994, 489p., University Microfilm order No. AAD94-28876, Ph.D. thesis. Refs. p.231-259.

Gravity and apatite fission track data from northern Victoria Land (NVL) have been applied to the study of the uplift of the Transantarctic Mountains (TAM). Gravity data show marked contrasts between NVL and southern Victoria Land (SVL). Modeling, partially constrained by seismic data in the Ross Sea, onshore seismic work in the Terra Nova Bay region, and seismic wave dispersion studies in East Antarctica, suggest that if crustal roots support the TAM, the range is not in local isostatic equilibrium. Instead, the mountains are overcompensated: unless flexurally suppressed, root structures would be expected to support significantly greater topographies. New apatite fission track (AFT) data from NVL and the NVL/SVL transition have defined the existence of six structural blocks, each with an independent history of uplift/denudation. Episodic uplift has been unequivocally detected within one vertical profile in the Admiralty Mountains (NVL). (Auth. mod.)

L-55211

Kellogg, K.S., **Paleomagnetic investigation of rocks from the Ohio Range and the Dry Valleys, Transantarctic Mountains, Antarctica,** *New Zealand journal of geology and geophysics,* 1988, Vol.31, p.77-85, 32 refs.

Two well-defined virtual geomagnetic poles (VGPs) for East Antarctica were obtained from the Middle Jurassic Ferrar Dolerite, sampled from a thick sill on Mt. Schopf in the Ohio Range, and from a horizontal sheet intruding Paleozoic granitic rocks at Mt. Cerberus in the Dry Valleys. The VGP from the sill at Mt. Schopf lies at lat. 58°.0S, long. 129°.0W (dm=13°, dp=12°), and the VGP from Mt. Cerberus lies at lat. 57°.8S, long. 135°.7W (dm=6°, dp=6°). Rocks from both localities have normal polarity magnetizations. These data, together with 15 other acceptable pole positions reported in the literature, define a Middle Jurassic paleomagnetic pole at 52°.7S, 139°.6W (α_{95}=4°.4), which is not significantly different from previously reported mean Middle Jurassic paleomagnetic poles from East Antarctica. Paleomagnetic investigations in the Ohio Range of mafic inclusions in Ordovician granitic and sedimentary rocks of Devonian and Permian ages showed that the rocks are magnetically unstable and are unreliable for determining a paleomagnetic pole. (Auth.)

L-55262

Vila Codina, J., Correig Blanchar, A.M., Ortiz, R., Battló Ortiz, J., **Origin and evolution of volcanic tremors on Deception I.** [Temblores volcánicos en Decepción. Origen y evolución], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.224-229, In Spanish with English summary. 16 refs.

DLC G845.S93

Analysis of frequency spectra of volcanic tremors recorded on Deception I. during the 1986-87 and 1987-88 summer expeditions suggests that their origin is associated with strong resonance phenomena. The turbulent motions induced by escaping gasses within the conduit, from shallow aquifers to the surface, agree with experimental data and is a proposed cause of volcanic tremors. More systematic information seems to be needed for a better knowledge of the source model and location, and for correlation between tremor features and volcanic activity. (Auth. mod.)

L-55263

Vila Codina, J., Correig Blanchar, A.M., Maciá Jove, R., Ortiz, R., **Low-velocity layer associated with the latest eruptions on Deception I.** [Detección de una capa de baja velocidad asociada a las últimas erupciones en Decepción], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.230-234, In Spanish with English summary. 7 refs.

DLC G845.S93

During the antarctic summer expeditions of 1988-89, a seismic network was installed on Deception I. More than 1,000 events have been digitally recorded and the quality of the records allows the epicentral location of more than 100 of them to be determined. Residual analysis shows a delay time that correlates with the presence of an intrusive body previously mapped by the magnetic survey of the island's central bay. It is situated in the oriental sector of the island and shows a linear trend pointing in a NNW-SSE direction. This is where the latest volcanic eruptions took place (1967, 1969 and 1970). (Auth.)

L-55264

Ortiz, R., Boloix, R., Carreño, E., **Seismic refraction experiment at Port Foster** [Interpretación preliminar de un ensayo de perfil sísmico de refracción en Port Foster (isla Decepción)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.235-237, In Spanish with English summary. 5 refs.

DLC G845.S93

In 1987-88 a seismic refraction experiment was carried out in Port Foster Bay, Deception I. The preliminary results of this study yield a three layer seismic model characterized by relatively low velocities, generally ranging from 1.5-1.8 km/s in the uppermost layer to 4.5 km/s at depth of about 5-6 km in the deepest layer. (Auth.)

L-55265

Ortiz, R., Vila Codina, J., Sastre Pérez, J.C., **Seismic activity on Livingston and Deception islands** [Actividad sísmica en el entorno de la Base Antártica Española Juan Carlos I (islas Livingston y Decepción)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.238-243, In Spanish with English summary. 18 refs.

DLC G845.S93

A preliminary analysis of the data obtained by the Deception I. seismic network during Dec. 1988 and Jan.-Feb. 1989 shows significant seismic activity. More than 2,000 events were recorded during this period with more than 1,000 in digital format. The quality of the recorded data allows the epicentral location of more than 100 events to be determined. The distribution of the independent temporal series of events shows a good correlation with the island's fracture system. The fractures correspond with the regional tectonic system, which affects the seismic activity in the zone. (Auth.)

L-55266

García, A., Viramonte, J.G., Vila Codina, J., Ibáñez, J.M., **Study of the magnetic field in Port Foster** [Estudio del campo magnético en Port Foster (isla Decepción)], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.244-249, In Spanish with English summary. 20 refs.

DLC G845.S93

A magnetic survey was carried out on Deception I. as part of an international Antarctic Volcanism project under CSIC and the Instituto Antártico Argentino scientific programs. The existence of a NW-SE lineal structure has been detected by a minimum magnetic zone with more than 3,000 nT decreasing field values. This structure is associated with an intrusion by materials at high temperature. (Auth.)

L-55267

Viramonte, J.G., Ramos, M., García, A., Suazo, C., Díez Gil, J.L., **Magnetic profiles of the fracture system of northwestern Deception I.** [Perfiles magnéticos sobre el sistema de fracturas del sector noroeste de Decepción], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.250-253, In Spanish with English summary. 4 refs.

DLC G845.S93

During the 1988-1989 antarctic expedition, geomagnetic studies were carried out based on ground profiles of the northwestern part of Deception I. The maximum magnetic field values are associated with the main NW-SE fault systems. The data show a 6000 nT variation at the fracture crossings.

L-55270

Ortiz, R., Vila Codina, J., **Antarctic instrumentation. Seismic Digital Net** [Instrumentación antártica. Red Sísmica Digital], Actas del tercer Symposium Español de Estudios Antárticos, Gredos, 3 al 5 de octubre de 1989. (Spanish Symposium on Antarctic Studies, 3rd, Gredos, Oct. 3-5, 1989. Proceedings). Edited by J. Castellví, Madrid, Comisión Interministerial de Ciencia y Tecnología, 1990, p.345-348, In Spanish with English summary. 8 refs.

DLC G845.S93

A low power, automated seismic processor of microearthquake network data has been designed, fabricated, and deployed by CSIC for initial operation in Antarctica in monitoring seismicity associated with the volcanic and tectonic activity on Deception and Livingston islands. The system operated in Antarctica in the austral summers of 1987-88 and 1988-89; more than 2,000 events were monitored and digitally recorded. (Auth.)

L-55474

Meert, J.G., Van der Voo, R., **Paleomagnetic and ^{40}Ar/^{39}Ar study of the Sinyai Dolerite, Kenya: implications for Gondwana assembly,** *Journal of geology,* Mar. 1996, 104(2), p.131-142, 39 refs.

New paleomagnetic and ^{40}Ar/^{39}Ar age data from the Sinyai metadolerite dike in central Kenya support the suggestion that the eastern portion of Gondwana was assembled during two separate orogenic events. The dike intrudes Mozambique Belt metasediments dated ca. 700 Ma and was itself metamorphosed to greenschist facies at 547 Ma. This greenschist-facies event reset the original magnetization in the rocks and occurred over a time span that included at least one field reversal. The paleomagnetic pole at 20°S, 319°E augments the available paleomagnetic database for Gondwana and suggests that Gondwana assembly was completed by 550 Ma; therefore the concept of a united East Gondwana continent may not be valid for pre-550 Ma time. In this model, the 650-800 Ma East Africa Orogeny resulted from a collision between the Congo craton of East Africa and the IMSLEK terranes (India, Madagascar, Sri Lanka, Enderby Land, and the Kalahari craton.) A pervasive granulate-facies metamorphic event at ca. 550 Ma in parts of East Gondwana, coupled with paleomagnetic evidence for a united Gondwana at 550 Ma, led to the suggestion of a Kuunga Orogeny at this time, resulting from the collision of Australo-Antarctica with Congo-IMSLEK. (Auth. mod.)

L-55759

Jiang, J.Z., Tang, J.Y., Xu, D.Q., **Source of the geoid depression in Antarctica,** Zhongguo diyijie Nandayang kaocha xueshu taolunhui lunwen zhuanji (China Symposium on Southern Ocean Expedition, 1st, Hangzhou, May, 1988. Proceedings), Shanghai, Kexue jishu chubanshe (Shanghai Science and Technology Publisher), 1989, p.424-432, In Chinese with English summary. 13 refs.

DLC G845.5.C45 1989 Orien China

In an attempt to determine the source of the geoid depression in Antarctica, the thickness of the crust was calculated by gravity inversion methods and standard seismic sounding data. On this basis, the authors computed the geoidal undulation caused by the interior mass anomalies of the lithosphere. Compared with the geoidal undulation calculated from satellite gravitational data, it is suggested that the interior mass anomalies of the lithosphere dominated the geoidal undulation until the antarctic glacier reached its greatest height, during the Miocene-Lower Pliocene. After this the undulation greatly decreased, leading to the geoid depression in Antarctica. It is concluded that the actual ellipsoid flattening of the earth is greater than that of the hydrostatic equilibrium ellipsoid. (Auth. mod.)

L-55878

Shu, P.Y., Hu, J.F., Teng, J.W., Zhang, Z.J., Jiao, C.M., **Group velocity of seismic Love surface wave and lithosphere structure in Antarctic Peninsula,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.42-45, In Chinese with English summary. 8 refs.

This paper is based on the surface wave seismograms of the South Sandwich Is. earthquake (Ms=6.4) recorded at the Bernardo O'Higgins Station. The authors computed a group velocity dispersion of Love surface waves and obtained the lithospheric structure by applying the matched-filter frequency-time analysis and the grid dispersion inversion. Results shows that the crustal structure below the Antarctic Peninsula may be divided into three layers, and that their thicknesses are respectively 5, 8 and 10 km. The upper mantle velocity is 5.32 km/s, gradually changing into 5.11 km/s-4.9 km/s below 53 km. The minimum velocity is 4.8 km/s. It is inferred that the antarctic mantle is also a layered structure. (Auth.)

L-55880

Jiao, C.M., Kong, X.R., Liu, C.S., **Geomagnetic survey on frozen sea near Zhongshan Station, Prydz Bay, Antarctica,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.52-58, In Chinese with English summary. 11 refs.

As a preparation for future inland investigation in Antarctica, a geomagnetic survey was conducted during the 9th Chinese Antarctic Research Expedition of 1992-1993. The survey area, covering about 132 km^2, is located north of Zhongshan Station in Prydz Bay. The results show that there is a NW direction anomaly with 5-8 km width and 500 nT in amplitude. The anomaly is probably caused by a plutonic mass or a magnetite-rich body, located at a depth of 0.3-2.0 km below sea level. It has been shown that a large-range geophysical survey of Prydz Bay is fully feasible during the antarctic winter. (Auth.)

L-55881

Zhang, C.J., Jiang, F.Z., Fang, J., Lu, Y., **Calculation of the Moho-discontinuity and discussion of feature of gravity field in the antarctic region,** *Antarctic research (Chinese edition),* June 1996, 8(2), p.59-64, In Chinese with English summary. 3 refs.

The Bouguer gravity anomaly and free-gravity anomaly in Antarctica were calculated using the OSU91A potential model. An analysis was made of the cautions of the acute change of the free-air anomaly and the correlation between the free-air anomaly and height. Also calculated were the ice and crustal thicknesses using free-air anomaly data by means of the multi-layer inversion method. Results show that the thickest ice areas are found in East Antarctica. The pronounced undulation of crustal thickness also concentrates in East Antarctica, the thickest being 56 km. The crustal thickness in West Antarctica is only some 8 km. (Auth. mod.)

L-56008

Kuo, B.Y., Chenn, C.H., Zhang, Y.S., **Fast velocity anomaly to the west of the Australian-Antarctic Discordance,** *Geophysical research letters,* Aug. 15, 1996, 23(17), p.2239-2242, 13 refs.

To examine the hypothesis that the Australian-Antarctic Discordance overlays an anomalously cold upper mantle, the authors have measured Rayleigh wave group velocities along paths between the Southeast Indian Ridge and the Australian station NWAO. The group velocity peaks for events in the vicinity of 117°E, rather than for those within the discordance zone between 120 and 127°E. This variation is resolved at least for periods of 35-45 s. To model the cause, assumed velocity anomalies with simple geometry were tested using the surface wave Gaussian beam method in a forward sense. The preferred model consists of an elongated structure centered 300-500 km west of the discordance and stretching northward for at least 1000 km. The position of the anomalous structure is consistent with recent global tomographic models in this region. (Auth. mod.)

L-56118

Beck, F., Schott, J.J., Westphal, M., **Construction of a synthetic Australian and Antarctic Apparent Polar Wander Path (APWP) since 250 Ma** [Construction d'une courbe de dérive apparente du pôle (CDAP) synthétique pour l'Australia et l'Antarctique depuis 250 Ma], *Académie des sciences, Paris. Comptes rendus. Série II,* July 1996, 323(1), p.25-31, In French with English summary. 11 refs.

Australian and antarctic palaeomagnetic databases suffer from a lack of data for several periods of time. These two databases are combined in order to establish a synthetic Antarctic Apparent Polar Wander Path (APWP) for Australia and Antarctica since 250 Ma. The synthetic curve obtained in these two reference frames is compared to those established using Australian and antarctic data alone respectively. This synthetic path shows two important changes of direction: a first one around 160-180 Ma which corresponds to the initial rifting between Australia and Antarctica, a second one around 40 Ma which corresponds to the acceleration of the motion between both plates. These changes of direction are also the result of large-scale global reorganization of plate motion. (Auth. mod.)

L-56134

Russi, M., Costa, G., Febrer, J., **Broad band seismology in the Scotia region. The base Esperanza seismological observatory,** *International Centre for Theoretical Physics. Report,* Aug. 1995, IC-95/210, 19p., DE96-618142, 11 refs.

The lithospheric study and the identification of relevant lateral heterogeneities in the antarctic continent and borderlands is essential to understand the geodynamic evolution both of the continental and oceanic bordering regions. The complexity of the geological evolution and the structural properties of the lithosphere in the Scotia area have been stressed. The present setting of the area is the result of the mutual interaction among the antarctic, South American and several minor plates whose geodynamic history and actual boundaries are still partially unknown. The intense seismic activity that characterizes the region encourages the use of the seismological approach to investigate the lithospheric structure of the area. A broad band three components station is operating at the antarctic base Esperanza in the NE area, of the Antarctic Peninsula. The extension of the authors' analysis to further events and to horizontal component records is presented. (Auth.)

See also:

C-55256 C-56174 E-54235 E-54398 E-54399 E-54556 E-54566 E-54592 E-54603 E-54612 E-54629 E-54691 E-54927 E-54941 E-55006 E-55077 E-55085 E-55193 E-55260 E-55261 E-55290 E-55326 E-55550 E-55556 E-55560 E-55565 E-55569 E-55755 E-55756 E-56021 E-56049 E-56058 E-56178 E-56179 E-56181 E-56182 E-56259 E-56260 F-54412 G-56080 I-55269 J-56291 K-54120 K-54120 K-54212

M. POLITICAL GEOGRAPHY

M-54318

Dodds, K.J., **South Africa and the Antarctic, 1920-1960,** *Polar record,* Jan. 1996, 32(180), p.25-42, Refs. and notes p.39-42.

The South African state has never made a formal claim to the antarctic continent. In the inter-war period, the South African government prepared a number of memoranda and discussion papers on the subject of a 'South African sector in the Antarctic.' The present paper not only critically interprets those government papers but, more importantly, assesses the reasons why South Africa never made a formal claim. It is suggested that relations with Britain and the Empire, as well as the activities of Norway and the United States, were crucial determining factors. Finally, the implications for late South African involvement in the South Atlantic and the Antarctic Treaty System are briefly considered. (Auth.)

M-54323

Kriwoken, L., Keage, P., **Antarctic Treaty System,** *Canberra. Australian National University. CRES. Resource and Environmental Studies,* 1989, No.1, Antarctica: policies and policy development. Edited by J. Handmer, p.1-6, 9 refs.

The Antarctic Treaty System comprises four interacting elements: the Antarctic Treaty and the recommendations of 13 biennial Consultative Meetings and several Special Meetings; the Convention for the Conservation of Antarctic Seals (1972); the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) (1980); and liaison with outside bodies, especially the Scientific Committee for Antarctic Research (SCAR). The geographic jurisdiction and the significance for nature protection of these elements are summarized.

M-54324

Hearder, J., **Australian government perspective,** *Canberra. Australian National University. CRES. Resource and Environmental Studies,* 1989, No.1, Antarctica: policies and policy development. Edited by J. Handmer, p.7-12, 1 ref.

Australia's main priorities regarding the future of Antarctica are to maintain strategic and political security; protect the environment; continue access for scientific and possible economic activities; and to maintain its sovereignty and influence. The chief means of achieving these priorities are considered to be through Australian antarctic bases and by continuing to be active in the Treaty System, antarctic organizations, communities and other concerned bodies. The Australian government is generally opposed to the idea of Antarctica being granted 'world park' status, as future scientific research, fishing, tourism and mining would not necessarily be accommodated. (Auth. mod.)

M-54325

Herr, R., Hall, R., **Science as currency and the currency of science,** *Canberra. Australian National University. CRES. Resource and Environmental Studies,* 1989, No.1, Antarctica: policies and policy development. Edited by J. Handmer, p.13-24, 21 refs.

Science has emerged as the basic international currency for practical influence in antarctic affairs. In recent years, Australia may not have maximized its use of this currency. In part, this is because the instrumental aspects of antarctic science have not been adequately acknowledged in some policy-making circles. Concern over Australia's effective pursuit of influence through the instrumental use of science arises from the nature of the current rebuilding program at Australia's antarctic bases, the manner in which Australian Antarctic Expeditions (ANARE) appear to be assembled, and transport arrangements. It is suggested that Australia should pursue quality research and keep firmly in mind the instrumental value of this research. It is argued that because there are grounds for believing that the role of science as the medium of exchange in Antarctica is on the downward slope of devaluation, Australian policy makers must monitor the fluctuating value of science in the market of antarctic politics. (Auth. mod.)

M-54326

Graham, A., **Environmentalist's perspective on the future of Antarctica,** *Canberra. Australian National University. CRES. Resource and Environmental Studies,* 1989, No.1, Antarctica: policies and policy development. Edited by J. Handmer, p.25-29.

It is argued that Antarctica should not become a 'museum'. Rather, scientific and commercial activities should continue under careful controls so as to preserve the wilderness, the opportunities for 'unique science', and aquatic and terrestrial plant and wildlife. These conservation priorities for antarctic management are discussed against a background of uncooperative action by nations with antarctic interests, and the global phenomenon of over-exploitation of natural resources. It is also argued that mining is the greatest threat to the wilderness status of Antarctica. Patterns of human exploitation in the region have impacted significantly on plant and animal life. For example, rapid depletion of krill stocks through over-exploitation is identified as a major environmental threat. It is noted, with concern, that air pollution is reducing the claim that much of Antarctica can be regarded as 'untouched'. The ozone hole, which can only be assessed from the Antarctic, is an example of the unique science possible in the area. (Auth.)

M-54327

Kriwoken, L., Keage, P., **Antarctic environmental politics: protected areas,** *Canberra. Australian National University. CRES. Resource and Environmental Studies,* 1989, No.1, Antarctica: policies and policy development. Edited by J. Handmer, p.31-48, Refs. p.46-48.

This paper examines the protected area network established by the Antarctic Treaty System (ATS), that amalgam of recommendations and conventions, procedures and rights that governs antarctic development. The rationale for studying protected areas and the characteristics of the ATS which are important for natural resource conservation are summarized. Existing terrestrial and marine protected areas are analyzed and threats to them identified. A wide range of practical improvements to the network of protected areas is recommended. Implementing an antarctic conservation strategy, lessons which can be gained from arctic conservation, and closer working relations between SCAR and IUCN are included. (Auth.)

M-54328

Doyle, T.J., **Antarctic Treaty: within or without?,** *Canberra. Australian National University. CRES. Resource and Environmental Studies,* 1989, No.1, Antarctica: policies and policy development. Edited by J. Handmer, p.49-62, 34 refs.

On the premise that very little is spent on campaigns to raise public awareness of conservation issues in Antarctica, it is suggested that a more egalitarian governing mechanism which gives a higher priority to conservation is needed for Antarctica. Alternative political structures include the World Park Treaty and the United Nations option, which emphasize stringent observance of more comprehensive conservation policies. However, many conservation organizations argue that these alternative structures are not viable. Instead they prefer the option of creating a 'Conservation Convention' within the existing structure of the Antarctic Treaty. This paper is followed by comments from A. Constable, representative to CCAMLR, reviewing T.J. Doyle's article. (Auth. mod.)

M-54329

Davis, B., **Australia and the future of Antarctica,** *Canberra. Australian National University. CRES. Resource and Environmental Studies,* 1989, No.1, Antarctica: policies and policy development. Edited by J. Handmer, p.63-69, 27 refs.

It is pointed out that the claimed benefits of the Antarctic Treaty include peaceful scientific cooperation, demilitarization of the region and careful environmental management of an area of outstanding natural beauty. There are dissenters from these views, expressing concern about the limitations and ambiguity of Treaty provisions; arguing that hidden political tensions and rivalries exist, or that current environmental safeguards are insufficient to ensure long-term conservation of the region. Given that the Treaty is prospectively open to review from 1991 onwards, it is suggested that this is an appropriate time to examine Australia's policy stance. (Auth. mod.)

M-54336

Manzoni, M., Pagnini, P., **Power and strategies: aspects of antarctic political geography** [Potere e strategie: aspetti di geografia politica antartica], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.185-208, In Italian with English summary. Refs. p.205-207.

DLC G17.S69

The classic concepts of political geography, beginning with the fundamental one of territory, have proven inadequate to an understanding of the geopolitics of Antarctica. On the basis of this reflection, the authors analyze the forms of interaction among antarctic space, power, and the strategies carried out. The international community is currently choosing between further development of traditional appropriative territorial policies and different, more innovative solutions in which Antarctica would assume extraterritorial status. This second, nontraditional solution is more favorable to peaceful development; indeed, not only the fully constituted territories but also places of virtual sovereignty are the cause of conflict and confrontation. Political geography, as a normative science, may contribute to the decision-making processes regarding antarctic space, identifying uses which reduce potential conflict and demonstrating that the renunciation of the creation of territory on the part of the states is more congenial to the common and peaceful use of the region. (Auth. mod.)

M-54337

Trucco, B., **Geographical aspect of recent events of international law regarding Antarctica** [Aspetti geografici delle recenti vicende di diritto internazionale relative all'Antartide], *Società Geografica Italiana, Rome. Memorie,* 1994, Vol.51, Verso una nuova geografia delle terre polari: sintesi e prospettive. Atti del Convegno della Società Geografica Italiana, Roma, 21-22 Novembre 1991 (A new geography of the polar regions: synthesis and perspectives. Italian Geographical Society Conference, Rome, 21-22 November 1991. Proceedings). Edited by G. Orombelli, C. Smiraglia, and R. Terranova, p.209-217, In Italian with English summary. 14 refs.

DLC G17.S69

The international legal aspects emerging from the Antarctic Treaty and the resulting convention are strictly bound to geographical problems and can be summarized as follows: territorial claims and the consequent politics of the sectors; safeguard of the antarctic ecosystem; and exploitation or protection of mineral resources in Antarctica. The main terms of the Treaty direct that Antarctica shall be used for peaceful purposes; that territorial claims shall be frozen; and provide freedom of scientific investigation. Conservation legislation in the region (regarding flora and fauna, and mineral resources) has been embodied in several conventions. (Auth. mod.)

M-54358

Machowski, J., **Antarctic Treaty's 30 years of operation** [30 lat funkcjonowania Układu w sprawie Antarktyki], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.58-61, In Polish. 9 refs.

DLC G578.S955 1989

A review of the Antarctic Treaty, its history and significance is presented. The optimal protection and use of Antarctica and its resources, in the interests of all people and nations—especially developing countries—is stressed. Active participation by Poland in the support and continued development of the Antarctic Treaty System is strongly recommended.

M-54375

Machowski, J., **Exploitation of mineral resources in Antarctica** [Eksploatacja zasobów mineralnych Antarktyki], XVI Sympozjum Polarne: Dorobek i perspektywy Polskich badań polarnych (16th Polar Symposium: Achievements and Prospects of Polish Polar Research). Edited by A. Olszewski, Toruń, Uniwersytet Mikołaja Kopernika, 1989, p.264-266, In Polish. 10 refs.

DLC G578.S955 1989

A brief overview of the convention regulating the exploration and exploitation of mineral resources in Antarctica is presented. It is predicted that exploitation of antarctic resources will not occur before the end of the century.

M-54402

Rothwell, D.R., **Maritime analysis of conflicting international law regimes in Antarctica and the southern ocean,** *Australian year book of international law, 1994,* 1994, Vol.15, p.155-181, 114 refs.

DLC JX3091.A9

Through the parallel development of the Antarctic Treaty System (ATS) and general and conventional international law provisions dealing with the law of the sea and protection of the international environment, there is now some overlap among the regimes. In addition, there exists in some provisions a conflict between the rights, duties and obligations of the State parties. This is partly a result of the impact of the Antarctic Treaty upon sovereignty and jurisdiction, the reliance of global instruments seeking to protect the environment upon State parties exercising domestic and extraterritorial jurisdiction, and the unique environmental conditions which exist in the region. This article explores these issues by particularly focussing on antarctic maritime claims, the deep seabed, resource management, and protection of the marine environment. In the process, an analysis is undertaken of relevant provisions adopted by Antarctic Treaty parties and of other international instruments having global application within the region.

M-54403

Kämmerer, J.A., **Protocol on Environmental Protection to the Antarctic Treaty,** *Law and State,* 1992, Vol.45, p.68-80, 12 refs.

DLC K12.A9244

This article highlights, in chronological order, the activities of the international community resulting in the signing of the Antarctic Treaty, the evolving of the Antarctic Treaty System, and the political, economic and legal features conducive to the call for a Protocol on environmental protection within the framework of the Treaty. The Madrid Protocol and its Annexes are examined in the light of its capacity to adequately protect the antarctic environment and research.

M-54423

Trofimov, V., **Legal status of Antarctica,** Moscow, Prometey, 1990, 140p., Notes and refs. p.122-138.

DLC KWX70.T76

The author discusses current international problems related to the legal status of Antarctica, including regulations dealing with economic development and protection of the antarctic environment. Particular attention is paid to the nature and character of the Soviet Union's rights in Antarctica. Emphasis is put on the legal basis of special rights of states that were original parties to the Antarctic Treaty, and their role in the development of Antarctica. The study deals with topical problems in the concept of "common heritage of mankind" and questions of legal regulation of various types of human activities, and compares provisions resulting from conventions on antarctic marine living resources and minerals. (Auth.)

M-54425

Chaturvedi, S., **Dawning of Antarctica: a geopolitical analysis,** New Delhi, Segment Books, 1990, 300p., Refs. passim.

DLC JX 4084.A5 C46

After a review of antarctic geography and history, an analysis is made of its complex geopolitical realities and dynamic perspective. Some of the following questions are addressed: what are the bases of territorial claims; how do these claims relate to the interests of the concerned parties; what is the political context of these claims; and is there a military and strategic spillover of these political considerations. India's objectives in Antarctica and the Indian role in the geopolitical framework are outlined.

M-54766

Lee, W.C., **China and Antarctica: so far and yet so near,** *Asian survey,* June 1990, 30(6), p.576-586, 19 refs.

DLC DS1.A492

The People's Republic of China (PRC) acceded to the Antarctic Treaty in 1983, was admitted to full consultative status in 1985 and will participate in the various deliberations undertaken to work out solutions to the challenges of the utilization of antarctic resources and decision making authority. Pertinent scholarly discussion has nevertheless been devoted primarily to the position of the twelve original member states within the regime; except for incidental references, no study has examined the position of the PRC with respect to its views on major substantive issues arising within the context of the Treaty. This article attempts to fill in the gap. After a brief glance at the overall development of the Antarctic Treaty system, the author scrutinizes specific aspects of Chinese policy toward Antarctica and the implications of this policy for China's role in international relations in general. (Auth. mod.)

M-54778

Anav, D., **Antarctic Treaty Consultative Parties' provisions for tourism** [Turismo in Antartide: le disposizioni della Riunione Consultiva di Kyoto], *Ambiente Antartide,* Dec. 1995, No.6, p.37-43, In Italian with English summary. 6 refs.

At the Kyoto Consultative Parties of the Antarctic Treaty meeting, a recommendation on tourism was approved, including two annexed sets of guidelines, or codes of conduct, the first one addressing tourists and visitors, the second, and more detailed, designed for antarctic tourists and non-governmental operators. No agreement was reached for establishing an international regulation of antarctic tourist activities by more strictly binding instruments, such as a separate convention or an annex to the Protocol. (Auth.)

M-54802

Bjørklund, C., **Comparison of the legal environmental regimes in the Arctic and Antarctic,** World Wilderness Congress, 5th, Tromsø, Norway, Sep. 1993: Arctic wilderness, edited by V.G. Martin and N. Tyler, Golden, CO, North American Press, 1995, p.139-147.

DLC QH77.A68W67 1993

Comprehensive environmental regimes governing the arctic and antarctic polar regions were developed during the early 1990s. The Protocol on Environmental Protection to the Antarctic Treaty provides protection for the Antarctic. Although the Antarctic Treaty of 1959 made no specific provisions for environmental protection of Antarctica, the signatories to the treaty have created legislation to protect the region from excessive development. The legal environmental regimes established for the Arctic and Antarctic are compared. (Auth. mod.)

M-54803

Ulfstein, G., **Arctic and Antarctica: legal and political perspectives,** World Wilderness Congress, 5th, Tromsø, Norway, Sep. 1993: Arctic wilderness, edited by V.G. Martin and N. Tyler, Golden, CO, North American Press, 1995, p.148-151.

DLC QH77.A68W67 1993

There is an increasing awareness of the need for environmental protection in polar areas. The general emphasis on environmental protection is reflected in the 1992 United Nations Conference on the Environment and Development in Río de Janeiro. The polar areas are, however, extremely vulnerable to human activities, and they have been regarded as symbols of adventure and purity. The Arctic and Antarctic have therefore been the objects of special environmental concern. The factors affecting management problems and the legal and political framework for management in the two regions, and the differences in political perspectives between them, are reviewed.

M-54804

Lucas, P.H.C., **National parks and protected areas in polar regions,** World Wilderness Congress, 5th, Tromsø, Norway, Sep. 1993: Arctic wilderness, edited by V.G. Martin and N. Tyler, Golden, CO; North American Press, 1995, p.161-169.

DLC QH77.A68W67 1993

The earliest explorations of the polar regions by Westerners were conducted for geographical and scientific purposes, such as the quests for the Northwest Passage, and the North and South Poles. These expeditions did not inflict many human impacts on the regions being explored. However, modern scientific and commercial activities in these regions, supported by advanced technologies, have eroded the environmental integrity of the areas. As wild areas in the temperate and tropical regions of the planet continue to decline due to human activities, debate over the fate of polar regions has burgeoned. A survey of the current status of efforts aimed at creating and maintaining national parks and protected areas in polar regions is presented. Differences between the northern and southern polar regions are detailed. (Auth. mod.)

M-55053

U.S. National Science Foundation, **Antarctic Conservation Act of 1978 (Public Law 95-541) with regulations, maps of special areas, application forms,** Washington, D.C., June 1989, 80p.

This booklet contains the text of the Act, the regulations pursuant to the Act, and a form to be filled out and submitted to the National Science Foundation by persons wishing to do things permitted by the Act. Maps delimit Specially Protected Areas (subpart G of the regulations) and Sites of Special Scientific Interest (subpart H). In addition, the booklet contains a copy of the Agreed Measures for the Conservation of Antarctic Fauna and Flora, including Management Plans for Specially Protected Areas, and a copy of the Antarctic Treaty Recommendations Pertaining to Sites of Special Scientific Interest.

M-55288

Mielke, J.E., Browne, M.A., **Antarctica: environmental protection, research, and conservation of resources,** *CRS report for Congress,* Apr. 5, 1995, 95-476 SPR, 10p.

This report provides a summary of the development and evolution of the Antarctic Treaty, with annexes, which together comprise the Antarctic Treaty System. The governing body of the ATS is described and its actions over the years, through recommendations of the Consultative Parties, are outlined. The Conventions and Protocols which focus on five specific environmental and conservation concerns in antarctic regions are related and the current status of the most recent Protocol on Environmental Protection to the Antarctic Treaty is presented. It was signed in Madrid in October 1991 and would prohibit any mineral prospecting in antarctic regions, for other than scientific purposes, for at least fifty years. The Senate gave its advice and consent in October 1992; the required implementing legislation has not yet been agreed to.

M-55294

Jackson, A., ed, International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995, **On the antarctic horizon. Proceedings,** [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], 118p., For individual papers see A-55296, A-55297, A-55299, A-53000, M-55295, M-55298, M-55301 and M-55302.

The proceedings of the International Symposium on the Future of the Antarctic Treaty System, held in Ushuaia, Argentina, Mar. 20-24, 1995, consists of 7 lead papers, or 7 themes: the development of the Antarctic Treaty System; new areas of cooperation; directions of scientific research; relations with international organizations; relations between elements of the Antarctic Treaty System; environmental management under the Madrid Protocol; and future development of the Antarctic Treaty System. Each is followed by a plenary discussion by various commentators and concluding remarks. A supplementary paper and the Chairman's summary of the symposium conclude this volume.

M-55295

Pinochet de la Barra, O., Gautier, P., **Development of the Antarctic Treaty System - Review of past developments,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.7-22.

In reviewing and discussing the evolution of the Antarctic Treaty System, the conclusion is reached on what lessons are to be derived from the past to help meet the challenges of the future. The focus is on three basic elements: Article IV of the Antarctic Treaty and the "common administration" of Antarctica; promotion of science; and protection of the environment.

M-55298

Karev, S., Arvesen, J., **Relations with international organisations - UNEP, IMO, FAO, WMO, ICAO, and UNGA,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.43-56.

The relationship between the Madrid Protocol and the United Nations Convention on the Law of the Sea is discussed at length; problems and inconsistencies are pointed out. Cooperation between the Antarctic Treaty Consultative Meeting and other international organizations, in particular with the United Nations Environment Program, is advocated.

M-55301

Wolfrum, R., Orrego Vicuña, F., **Possible challenges and the future development of the Antarctic Treaty System,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.85-102.

The essence of this session's discussion concerns the need to improve the effectiveness of the Antarctic Treaty System. Highlights of a few aspects deal with institutional arrangements, pointing out that the basic institutional structure of the Treaty system may need some consolidation and refinement; the need for a secretariat; legal developments, including the approach to decision making; and enforcement, examining the question of port state jurisdiction.

M-55302

Beltramino, J.C., **Some considerations on the future of the Antarctic Treaty System,** International Symposium on the Future of the Antarctic Treaty System, Ushuaia, Argentina, Mar. 20-24, 1995. On the antarctic horizon. Proceedings. Edited by A. Jackson, [Kingston, Tasmania], Consejo Argentino para las Relaciones Internacionales/Australian Antarctic Foundation, [1995], p.103-107.

In this supplementary paper to the 7 leading articles in this volume, the author considers the following: the main trends in the Antarctic Treaty System (ATS) during the last decade; the ATS in its historic and political framework; future internal and external challenges to the ATS, examining negative influences and major disruptions; and developing and strengthening the ATS.

M-55354

Manzoni, M., Pagnini, P., **Symbolic territory of Antarctica,** *Political geography,* 1996, 15(5), p.359-364, 1 note.

Territorial production in Antarctica, politics and the antarctic territory, and the normative role of political geography in Antarctica are the subjects of this Comment. It is concluded that occupation, under the southern polar region's geographic and environmental conditions, creates a spatial order upon which power works only weakly and which, therefore, does not correspond to the current accepted meaning of territory. It is suggested that, from a scientific point of view, the most appropriate concept for defining the political condition of antarctic space is that of metaterritory.

M-55360

Colacrai de Trevisan, M., **Madrid Protocol: a vital compromise for the consolidation of the antarctic regime** [Protocolo al Tratado Antártico sobre Protección del Medio Ambiente: un vital compromiso a la consolidación del régimen antártico], *Boletin Antártico Chileno,* May 1996, 15(1), p.9-12, In Spanish. 8 refs.

The environmental concerns leading to the adoption and implementation of the Madrid Protocol and the Protocol's contribution to the consolidation of the antarctic regime are discussed. Special conventions developed within the above framework, including CCAS, CCAMLR and CRAMRA, are reviewed. Certain considerations concerning Latinoamerican cooperation in dealing with the new challenge of coordinating antarctic politics are presented.

M-55427

U.S. Department of State, U.S. Arms Control and Disarmament Agency, **Report of the United States Antarctic Inspection, Feb. 9 to Mar. 11, 1995,** Washington, D.C., 1995, 79p.

This Team Report in 2 parts provides results of inspections made under the terms of the Antarctic Treaty by U.S. representatives at antarctic stations of 8 countries. The stations' activities, facilities and personnel, scientific programs, equipment, logistics and tourism are described. No violations of the Antarctic Treaty were observed during the 1995 inspection. Access to any and all areas of stations visited was readily accorded to the inspection team. Station leaders and personnel were frank and open in discussion of their station operations, from research activities to logistical support.

M-55432

Chaturvedi, S., **Polar regions: a political geography,** Cambridge, UK, Scott Polar Research Institute, University of Cambridge, 1996, 306p., Refs. p.269-296.

This book proposes that the "poles apart", *sui generis* theme is outdated and should not be allowed to obscure either the manner in which the polar scene today both reflects and influences international relations in general or the fact that existing polar controversies are merely arctic and antarctic manifestations of the linkages as well as contradictions between economic growth and the imperatives of environmental conservation, sometimes so casually covered under the term "sustainable development". It studies the two polar regions together as "social science laboratories", testing some of the assumptions of the new geopolitics and evaluating its promise and prospects there. (Auth.)

M-55444

U.S. Executive Office of the President. National Science and Technology Council. Committee on Fundamental Science, **United States Antarctic Program,** Washington, D.C., Apr. 1996, 67p.

The United States has important foreign policy, national security, scientific, and environmental interests in Antarctica. A strong year-round presence in the area, in the form of cutting-edge scientific research supported by infrastructure at three research stations, is the principal means of realizing these interests. The Amundsen-Scott Station at the South Pole is of particular importance in this regard, but its buildings and associated life-support systems are nearing the end of their design life and are in need of replacement. The estimated cost of replacement is substantial, and this, combined with current and anticipated budget constraints, raises important issues concerning the U.S. Antarctic Program (USAP). In particular, the Senate Appropriations Committee has expressed concern over the costs of the USAP, questioned whether the existing policy to maintain a presence in Antarctica is still valid, and has called for the National Science and Technology Council to undertake a Government-wide review of that policy and to examine options that can reduce the annual operating cost. This document reports the results of that review.

M-55510

Deihl, C., **Antarctica: an international laboratory,** *Boston Col-*

lege environmental affairs law review, Spring 1991, 18(3), p.423-456, 238 refs.

DLC K5.N83 1991

This article's purpose is to determine how Antarctica's environment best can be protected. Proponents of the Convention on the Regulation of Antarctic Mineral Resources Activities (CRAMRA) believe that the Antarctic Treaty members need to enter into a minerals regime in order to avoid an unregulated gold rush in Antarctica. They argue that only by ratifying a minerals regime will Treaty members be able to control and regulate mineral exploitation in Antarctica. Critics of CRAMRA advocate a complete ban on mineral exploration and exploitation. They propose that setting aside Antarctica as a World Park is the only way to protect Antarctica's environment. This article examines both the World Park proposal and CRAMRA to determine which is better for the antarctic environment. Although the article discusses geopolitical influences, it only looks at these influences as they affect environmental protection. It is concluded that the best way to prevent the despoliation of Antarctica is to follow the recommendations of environmentalists and to prohibit minerals exploration in the antarctic region permanently.

M-55521

Kaye, S., Rothwell, D.R., **Australia's antarctic maritime claims and boundaries,** *Ocean development & international law,* July-Sep. 1995, 26(3), p.195-226, Refs. p.216-226.

DLC JX1.O25

Since the Antarctic Treaty was negotiated in 1959, there have been substantial developments in the law of the sea. One of the most significant developments has been the recognition granted to coastal state entitlements to claim a range of offshore maritime areas. Yet, one of the principal aims of the Antarctic Treaty was to eliminate sovereignty disputes between territorial claimants, and the treaty placed limitations on the assertion of new claims. Nevertheless, most antarctic territorial claimants have asserted some form of antarctic maritime claims. This article particularly considers Australia's position toward maritime claims offshore of the Australian Antarctic Territory (AAT). It reviews the limitations imposed by the Antarctic Treaty, the difficulties in determining baselines in Antarctica, Australia's practice in declaring antarctic maritime claims, and the potential range of maritime boundaries that Australia may one day have to delimit with neighboring states in the southern ocean. (Auth.)

M-55522

Simmonds, K.R., **Antarctic conventions,** London, Simmonds & Hill Publishing Ltd, 1993, 324p., Refs. p.317-324.

DLC KWX706.A23S58

The purpose of the material presented is to review the changed direction and focus of the debate and nature of the challenges to the Antarctic Treaty System that became crystallized by the negotiation and the signing of the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) in 1988, and by the subsequent negotiation and signing of the Protocol on Environmental Protection to the Antarctic Treaty in 1991. The text includes the Articles of the Antarctic Treaty, of CRAMRA and of the Protocol, as well as the Articles of the Convention on the Conservation of Antarctic Seals, 1972, and the Convention on the Conservation of Antarctic Marine Living Resources, 1980.

M-55528

1993 Fenner Conference on the Environment, Handmer, J., ed, Wilder, M., ed, **Towards a conservation strategy for the Australian Antarctic Territory,** Canberra, Australian National University, May 1993, 216p., Refs. passim. For individual papers see A-55529, A-55530, A-55533, A-55536, B-55532, M-55531, M-55534 and M-55535.

This volume contains the proceedings of the 1993 Fenner Conference on the Environment, which was held as a step in the preparation of a conservation strategy for the Australian Antarctic Territory (ATT). The volume consists of 2 parts: Conference papers in pt.1, in which the participants and various specialists consider broad issues critical to the conservation and management of the ATT and the adjacent southern ocean, and pt.2, which contains an edited version of each of seven working group reports, and the discussion each report generated when presented at a plenary session.

M-55531

Hemmings, A.D., Goldsworthy, L., **Why is an Antarctic conservation strategy necessary?,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.41-52, 12 refs.

It is argued that Australia, as claimant to some 42% of the antarctic continent, and with sovereignty over several subantarctic islands, needs an integrated approach to the region. It needs structures through which to manage—and if necessary adjudicate between—the various values seen in Antarctica. The Australian Antarctic Conservation Strategy will need to embrace the reality of other national operators in the Australian Antarctic Territory. With Australia as a prime mover in the process of achieving the Madrid Protocol, further Australian initiatives are likely to carry considerable international influence. As a management plan, the Strategy will provide an international model on an enormous scale, with a significance beyond the antarctic context. (Auth. mod.)

M-55535

Sayers, J., **Infrastructure development and environmental management in Antarctica,** 1993 Fenner Conference on the Environment. Proceedings. Towards a conservation strategy for the Australian Antarctic Territory, edited by J. Handmer and M. Wilder, Canberra, Australian National University, May 1993, p.109-147, 13 refs.

Australia's antarctic infrastructure has developed in response to priorities and goals which were determined up to 50 years ago. The original infrastructure reflected the then logistic constraints, as well as the national priority of being seen to preserve a substantial territorial claim. On the premise that national antarctic programs have to meet contemporary standards, this paper examines how Australia's antarctic logistic infrastructure has responded to the changing circumstances of the Antarctic. It questions whether the logistic systems which have evolved over the last five decades are now appropriate at a time when all government activities are expected to improve efficiency and do more with less. The paper concludes that Australia must think creatively about providing a logistic infrastructure that will continue to meet national priorities in the Antarctic into the next century. (Auth. mod.)

M-55763

Simmonds, K.R., **International legal protection of the environment: towards a new legal regime for Antarctica,** *Oil & gas law and taxation review,* 1990, 8(10), p.337-343, 59 refs.

DLC K3911.2.O35 1989-90

The purpose of this paper is to review, principally in the light of events since 1983, the changed direction and focus of the debate over the legal, political and scientific issues and the nature of the challenges to the Antarctic Treaty System. These have become crystallized, in large measure, by the negotiation and the signing at Wellington, New Zealand on Nov. 25, 1988 of the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA).

M-55768

Beck, P.J., **Antarctica: The Antarctic Treaty System after thirty years,** *World boundaries series,* 1994, Vol.1, Global boundaries. Edited by C.H. Schofield, p.76-97, Refs. p.95-97.

DLC JX4111.G56 1994

The question of sovereignty and boundaries in relation to Antarctica is discussed, and attitudes toward the Antarctic Treaty System from late 1950s to 1991 are examined.

M-55769

Arenas, H.S., **Future of the Antarctic Treaty—thirty years on,** *World boundaries series,* 1994, Vol.1, Global boundaries. Edited by C.H. Schofield, p.98-111, 12 refs.

DLC JX4111.G56 1994

The political and geographic evolution of Antarctica, from territorial claims to international property, is discussed; and future prospects for the Antarctic Treaty System, regarding minerals development, common heritage and geostrategic objectives, are evaluated.

M-55770
Auburn, F., **Antarctic legal system,** *World boundaries series,* 1994, Vol.1, Global boundaries. Edited by C.H. Schofield, p.112-118, 15 refs.

DLC JX4111.G56 1994

Legal issues arising under the Antarctic Treaty System are discussed, including review and amendment procedures, sovereignty and jurisdiction, criminal law and torts.

M-55775
Moneta, C.J., **Antarctica and international politics** [La Antártida y la política internacional], *Geopolitica. Hacia una doctrina nacional,* Jan.-Mar. 1991, No.42, p.59-63, In Spanish. 2 refs.

DLC F2834.G46 1991

Changes affecting the role of Antarctica in international politics in the late 1980s are discussed. An overview is presented of international cooperation in past and future activities necessary to protect the antarctic environment.

M-55807
Pineschi, L., **Environmental protection in Antarctica** [La protezione dell'ambiente in Antartide], Università degli studi di Parma. Pubblicazioni della Facoltà di Giurisprudenza, nuova serie, 16, Padua, CEDAM, 1993, 488p., In Italian with English summary. Refs. p.437-460.

DLC KWX705.P56 1993

The adoption of the Protocol on Environmental Protection to the Antarctic Treaty (PEPAT) is described as a definite step toward an environmentally oriented antarctic regime, confirming the practice of the Treaty Consultative Parties with problems requiring international cooperation in a constructive spirit. This book analyzes and evaluates PEPAT, not only in itself with its merits and shortcomings, but also in the light of current trends of international environmental law, including customary and Treaty law. The material is divided in 3 parts, addressing the following issues: Application of international environmental law to the antarctic continent and its surrounding waters; Protection and conservation of antarctic flora and fauna; and Regulation of human activities potentially dangerous to the antarctic environment.

M-55808
U.S. Congress. House. Subcommittee on Economic Policy, Trade and Environment of the Committee on Foreign Affairs and Committee on Merchant Marine and Fisheries, **Joint hearing on implementing legislation for the Protocol on Environmental Protection to the Antarctic Treaty,** Washington, D.C., U.S. Government Printing Office, 1994, 162p.

DLC KF27.F6465 1993j

In order for the United States to ratify the Environmental Protocol, Congress had to approve implementation legislation governing American activities in Antarctica. The hearing on Nov. 16, 1993 was called to examine the administration's views on the appropriate implementing legislation, as well as the views of the private sector. Oral statements taken from 5 witnesses, some of which have raised concerns about the administration's Antarctica proposal, especially on the issue of waste disposal, are presented. Four prepared statements and testimony submitted for the record from 9 parties are included.

M-55809
U.S. Congress. Senate. Committee on Commerce, Science, and Transportation, **Hearing on S. 1427, the Antarctic Scientific Research, Tourism, and Marine Resources Act of 1993, to implement the Protocol on Environmental Protection to the Antarctic Treaty,** Washington, D.C., U.S. Government Printing Office, 1994, 96p.

DLC KF26.C69 1993al

The hearing convened on Oct. 20, 1993 to discuss a draft bill from the administration entitled the "Antarctic Environmental Protection Act of 1993", to find answers to questions about provisions of the bill dealing with waste disposal and on how to treat citizen suits, and to discuss legislation to implement the Protocol on Environmental Protection to the Antarctic Treaty. Oral and written statements were taken from 6 witnesses representing the National Research Council, the Environmental Defense Fund, Greenpeace, Department of State, the International Association of Antarctic Tour Operators, and the National Science Foundation, who were responding to questions from members of the Committee.

M-55999
Rubattino, H.J., Pagano, H.S., Flagueras, P., Snyder, M., **Antarctica: current status and probable evolution as of 1991. Prospects for a new strategy** [La Antártida. Situación actual y probable evolución a partir de 1991. Perspectivas hacia una nueva estrategia], *Geopolitica,* July-Sep. 1990, No.41, p.31-45, In Spanish. 28 refs.

DLC F2834.G46 1990

A review is presented of events leading to the signing of the Antarctic Treaty in 1961; a historic analysis of the political situation and position of signatory countries in general, and Argentina in particular, at the time of the Treaty implementation; antarctic resources; the evolution of the Antarctic Treaty System (ATS) and possible alternatives of its future development which could directly affect Argentina. The second part of the article expands on the above themes, considering the process of modifying the Treaty as of 1991; the issue of sovereignty and jurisdiction; the peaceful coexistence of claimants and their objectives regarding antarctic living and mineral resources; and the legal, political and economic features of the ATS.

See also:
A-55287 A-55291 A-55292 A-55533 A-56287 B-54135 B-54387 B-55157

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